MAY 15, 1915
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THE COMMERCIAL CAR JOURNAL

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The real profit-making, business-building agency of the day is that for the great service-giving line of

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$1575

The four models comprising the line meet practically every requirement of delivery service, enabling the dealer to offer each prospect a truck particularly adapted to his needs.

Republic design has been proved right. Republic construction is unexcelled. Republic parts are the very best obtainable. Republic service is remarkable in its character. Republic success has been the sensation of a decade in the truck world.

This is the line upon which Republic dealers have built a phenomenal success:

SHAFT-DRIVE WITH INTERNAL GEARS		CHAIN-DRIVE MODELS	
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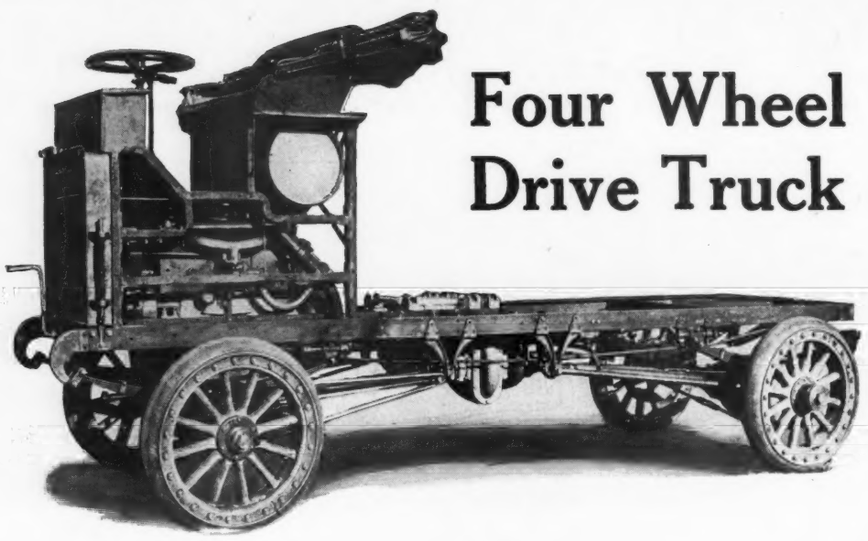
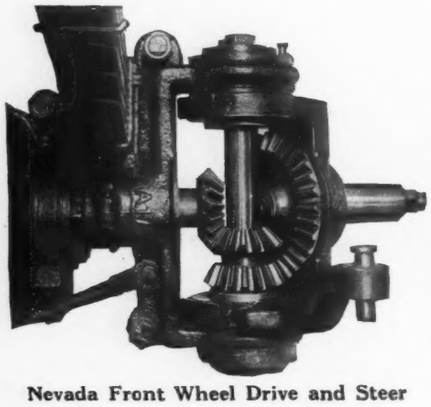


Four Wheel Drive Truck

A Truck of Great Selling Possibilities

The agency for the Nevada Truck offers dealers an exceptional opportunity to establish a profitable and permanent business connection. This is due to the fact that the truck possesses ability to give service under conditions such as no rear-drive truck could overcome and operate continuously at a lower cost than the latter.

The Nevada is a three-ton truck built along lines approved by the best engineering practice, with the additional advantage of being driven through all four wheels. This latter gives much greater tractive force, as the pushing of the rear wheels is reinforced by the pulling of the front wheels, thus enabling it to surmount traffic difficulties which would be too much for trucks driven through the rear axle only, and also makes it available for a tractor.



Nevada Front Wheel Drive and Steer

The Nevada's four-wheel drive not only gives greater pulling power, but increases the life of the truck and its individual parts by better proportioning of the load and strain. It is also more economical, requiring less gasoline and being much easier on the tires.

It is a truck which you can sell because its ability and superior advantages are easily demonstrated. Its economy of operation and maintenance is also a big selling factor.

To get a truck that will do more than others and cost less while doing it is the aim of every truck buyer. That is just what you can offer them in the Nevada.

Good territory is open. It will pay you to investigate this proposition for it is a money maker for energetic dealers. Write for details.

The Nevada Truck and Tractor Company

Nevada - - - - Iowa

The Publishers' Personal Page

Necessity Sharpens Industry

Signs of the Times

If day and night shifts, increases in factory equipment, construction of new buildings, and inquiry for men, are true indications of the condition of an industry, then the truck manufacturing industry is to-day a most prosperous one.

Coöperation and Progress

Coöperation among the manufacturers, the sharing of patent rights, the get-together spirit and the trend toward standardization of selling and service presage a new era in the Truck industry.

The automobile industry has never halted, nor even marked time, regardless of the financial condition existing in other lines of trade. To-day the truck business is more active than at any time in its existence.

The reasons are apparent; war orders, first and foremost, have set the wheels of production spinning, and put the needed lifeblood of cash into the veins of the makers.

Banking Conditions Improving

Home conditions are also improving. The banks, which are largely reponsible for the tightening up of money and credit, have felt, as usual, the inevitable reaction. The banks' business is selling or renting money. When they put up the price or refuse to sell or rent money, it is but a question of time when they become stocked with their own commodity, money, and must seek an outlet for it. This condition has now been reached. Banks are voluntarily reducing interest; are making offers to manufacturers of more generous loans. This means renewed activity, and is one of the most important signs of the times, prognosticating good business conditions in our own country.

Now is the time to plan for that increase, for that extension.

DAVID S. LUDLUM, PRESIDENT
JOHN S. CLARKE, VICE-PRESIDENT

EDWIN A. FITTS, SECRETARY-TREASURER

LOUIS S. CLARKE, VICE-PRESIDENT
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The Autocar Company

MANUFACTURERS OF

MOTOR VEHICLES

ESTABLISHED 1897

CABLE ADDRESS
AUTOCAR, ARDMORE
A.B.C. CODE

ADDRESS ALL COMMUNICATIONS
TO THE COMPANY

ARDMORE, PA. March 17th, 1915.

Autocar Sales & Service Company,

23rd & Market Sts., Philadelphia.

Attention of Mr. P. Prouty, Manager

My dear Mr. Prouty:-

We wired you today as follows:

"You are authorized to announce that the price of the Autocar motor delivery chassis has been reduced to sixteen hundred and fifty dollars. Letter follows."

This is the third reduction in the price of our chassis since January 1st, 1913. First we reduced from $2150 to $2000; then from $2000 to $1850; now from $1850 to $1650.

We now have twenty-four hundred different customers using from 1 to 280 Autocars each. Our business has increased 33 1/3% and 50% are repeat orders.

An increased list of customers and an increase in the volume of business will as in the past result in decreased expense of production and distribution; therefore keep advertising and continue strengthening your sales and service organization, as we propose to follow the policy of furnishing the consumer our product at the lowest possible price.

Yours very truly,
THE AUTOCAR COMPANY,
H. M. Coale
Sales Manager.

HMC-NM

The Commercial Car Journal

VOLUME IX | PHILADELPHIA, MAY 15, 1915 | NUMBER 3

MICHIGAN GARAGE MEN TO CONVENE

An important convention of the garage men of the State of Michigan has been called for May 22nd, in the Hotel Statler, Detroit, Mich., the purpose being to organize a state association, affiliated with the Associated Garages of America.

The Detroit garage men organized last August, when they incorporated as the Detroit Garage & Station Operators, under the laws of Michigan. About seventy of the better garages are represented in the membership, and now members are admitted only after careful investigation.

The purpose in organizing is to raise the standard of the garage business, and also to insure the mutual protection of the garage men and the public, to secure better legislation and assist the garage men to employ better business methods.

Garage men from all the cities and many towns in Michigan have accepted the invitation to attend the organization convention. There will be two business sessions, with a banquet in the evening and an auto ride about the city as entertainment features.

TO CARRY THE LIBERTY BELL BY AUTO TRUCK

The officials of the Automobile Club of Southern California co-operating with the National Highways Association are endeavoring to arrange to carry the Liberty Bell by way of Los Angeles up to the Panama-Pacific Exposition on a specially constructed truck over the National Old Trails road. Auxiliary motor trucks will be provided for carrying gasoline and oil, and a platoon of mounted cavalry will accompany the truck's precious relic if the arrangements are completed.

S. A. E. CHANGES HEADQUARTERS

The Society of Automobile Engineers, formerly located at 1790 Broadway, New York City, has moved to the Engineering Societies Building, 29 West Thirty-ninth Street. The offices will be on the sixth floor, and will be about the same number of rooms as used at the old address. One of the chief attractions in the new building is the use of the library in connection with the building.

Richmond, Va., reports that it costs its street sweeping department $4.18 to sweep a mile of paved street by motor sweeper as against $10.50 by hand.

Governor Ferris, of Michigan, has recently signed the Michigan garage lien bill which allows garage men to hold any vehicle on which work is being done by them until the charges for the work have been paid. Heretofore the garage men could not hold cars until payment had been made.

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BOSTON GARAGE FIRE RULES AMENDED

Fire Prevention Commissioner O'Keefe, of Boston, has amended the rule regarding concrete floors in small garages, which practically exempts the small variety of garage from the necessity of alteration unless it comes to his attention that with out such alteration the garage will become a menace to the general public. The new rule exempts garage built before July 1, 1911. According to the new rules, garages of not more than two-car capacity need not have a cement floor, even if the garage was built since July 1, 1911.

Autocar Company, Ardmore, Pa., has opened its large and completely equipped motor truck garage and service station at 553-57 West 23d Street, New York City. The Autocar Sales Company was formerly located at West 19th Street, but owing to rapidly increasing business larger quarters had to be secured.

SUMMER MEETING AND CRUISE OF THE S. A. E., JUNE 14–17

General Itinerary

Leave Detroit, Monday, 2 p.m., ss. Noronic.

Arrive Midland, Tuesday, 2 p.m., ss. Noronic.

Through Thirty Thousand Islands, Tuesday, p.m., ss. Waubic.

Arrive Parry Sound, Tuesday, 6 p.m. Dinner and Night on ss. Noronic.

Picnic at Point au Baril, Wednesday p.m.

Arrive Parry Sound, Wednesday, 6 p. m., ss. Waubic.

Arrive Detroit, Wednesday, 5 p.m., ss. Noronic.

Professional Sessions

Monday afternoon—Standards Committee Meeting.

Monday evening—Business and Professional Session.

Tuesday morning—Professional Session.

Tuesday evening—Professional Session.

Wednesday evening—Professional Session.

Thursday morning—Professional Session.

Section Nights

Monday evening at 10.
Tuesday evening at 10.
Wednesday evening at 10.

Stateroom Reservations

E. A. Holton, General Passenger Agent, Northern Navigation Company, Sarnia, Ontario, is now making reservations of staterooms. All reservations and purchase of tickets will be made through him. Diagrams of the Noronic can be seen at the office of C. Leidich, 69 Fort Street, West, Detroit.

Fare

Fare: $26 per person for complete trip on the Noronic and the Waubic, berth and meals included (two persons in a stateroom).

Children under twelve—half fare. Members may purchase accommodations for their family.

Reduced Railroad Rates

Ten or more members en route to Detroit from any one city can probably arrange with their railroad for reduced fares.

New York City to Detroit

The regular individual fare from New York City to Detroit is $16 each way. For a party of ten or more traveling together on one ticket, the fare is $13.95 in each direction. Pullman fares: Lower berth, $3.50; upper berth, $2.80; compartment, $10; drawing room, $13. Full information as to the S. A. E. party can be had from A. L. Miller, Passenger Agent, New York

The CCJ leads in circulation, advertising and prestige

Central Lines, 1216 Broadway, New York City.

From Points on P. R. R.

	Regular Fare	Party Fare
Philadelphia to Detroit.....	$16.00	$13.35
Pittsburgh to Detroit.....	$7.45	$6.69

The Round-Up

The S. A. E. cruise to Georgian Bay affords an opportunity to the members to take the most interesting and picturesque trip on the Great Lakes, on the best steamer, at moderate cost.

The friendly associations and professional advantages of the trip will be very much worth while. This is a truism which has been established by the marked success of the S. A. E. meetings, which have from year to year been representative in the best sense of the unique industry in which the members are employed. The semi-annual gatherings, and particularly those held during the summer, have been conspicuous in the engineering world for spontaneity and enlivening interest. No member should or can fairly to himself fail to do his part in maintaining the typical comradeship of the S. A. E., which is an open sesame to all that is worth while in automobile engineering ambition and development. The Meetings Committee and the Local Committee are working overtime. There will be doings by the Sections. So let your light shine. The interest in the meeting is deep and wide and there is every reasonable prospect that the host will be on hand technically primed and with bells on.

Internal Gear Drive Association, with headquarters in the David Whitney Building Detroit, has just been formed by the makers of the internal gear drive type of rear axle and all truck makers using this design of axle. The main object of the association is to become a clearing house for information on this type of drive, which is a comparatively new thing in American truck construction, although it is used on about 90 per cent. of the foreign trucks, exclusive of those made in Great Britain An educational campaign among dealers and users is to be started to acquaint them with exactly what the type is.

Chase Motor Truck Company, Syracuse, N. Y., contemplates the establishment of a Chase sales and service station in San Francisco. Mr. H. T. Boulden, general sales manager, is now on the Pacific coast, and, after establishing this branch, will visit all the larger Chase branches on the western coast, returning by way of the Southwest.

During March, the company made the largest shipments of trucks that had been made since it entered the heavy car field, but increased this business 45 per cent. in April over the preceding month.

Hoover Steel Ball Company, Ann Arbor, Mich., just completed new building 40x256 ft. and has let contracts for a large quantity of new machinery to be installed therein. The factory has been running day and night for a year and will continue to do so all summer. The new buildings will increase the company's output from 4,000,000 balls per day to between 6,000,000 and 7,000,000 daily.

United Motor Truck Company, Grand Rapids, Mich., whose truck was described in our last issue of the "CCJ" on page 17, states, through Mr. E. M. Elliott, that its sales in the United States during the month of April amounted to 402 trucks.

Personal Items

L. C. Long has become eastern district sales manager of the Federal Motor Truck Company.

Williams A. Kettenring, 1st vice-president of the Defiance Machine Works, Defiance, Ohio, died on April 1st.

W. J. Murray has been elected president and sales manager of the Splitdorf Electrical Company, Detroit, Mich.

H. R. Cool, formerly secretary of the Service Recorder Company, Cleveland, Ohio, has been appointed general manager of the company.

Norman E. Moses has been appointed manager of the Standard Auto Company's office at Madison Avenue and 22d Street, Toledo, Ohio.

Lloyd G. Busby, chief sales engineer of the Duplex Engine Governor Company, Inc., New York City, died on April 17th at Lima, Ohio, at the age of 26.

M. C. Meigs, formerly advertising manager of the J. I. Case Threshing Machine Company, has joined the force of the Lord & Thomas Company.

A. R. Howell, formerly connected with a well-known New York advertising concern, has become advertising manager for the H. W. Johns-Manville Company, New York.

John Orman has been appointed head of the new department of the Premier Motor Manufacturing Company, Indianapolis, Ind., which will make a specialty of funeral equipment.

T. H. Pelham, New York City, dealer of the Lippard-Stewart, sailed for Europe on April 29th. He recently placed an order for 130 two- and three-ton trucks with the United Motor Truck Company, Grand Rapids, Mich.

A. H. Raymond, who has been with the Packard agency in San Francisco after previous connection with the Packard factory and agencies in the other parts of the country for the past 10 years, has joined the organization of Earle C. Anthony, Incorporated, Los Angeles Packard agents, in charge of truck sales.

J. LEONARD REPLOGLE
Vice President American Vanadium Company

Mr. Replogle, in becoming Vice President and general manager of sales of the American Vanadium Company, terminated a connection of twenty-six years with the Cambria Steel Company, in which company he held similar positions for the past two years. His thorough experience as a steel maker and his wide acquaintance in the steel and railroad fields, qualifies him to further extend the market for vanadium-steel products.

Harry Stoddard, who has represented the Simms Magneto Company for some time in Detroit, has been transferred to the home office at East Orange, N. J., and is now in charge of the sales department.

Alex Schwalbach, for the past 6 years connected with the advertising and publicity department of F. & S. bearings, imported by the former J. S. Bretz Company and its successors, the Bearings Company of America, has resigned from that company.

H. L. Wittmore, for some time manager of the shoe department of the O'Sullivan Rubber Heel Company, New York City, has become advertising manager of the Autocar Company, Ardmore, Pa. Before going with the O'Sullivan concern he was connected with the Geo. L. Dyer Advertising Agency, New York City.

George M. Davis, formerly advertising manager of the E. R. Thomas Motor Company, and the Pierce Arrow Company, in Buffalo, and more recently connected with the retail field in New York State, has become resident manager of the Detroit offices of the Internal Gear Drive Company, 740 Whitney Building.

E. J. Weil, vice-president and general manager of the Cotta Transmission Company, Rockford, Ill., resigned for the purpose of engaging in another line of business for himself. The company announces that Mr. Weil never had any money invested in the Cotta Transmission Company. Edwin P. Reber, who has been with the company for some time, succeeds Mr. Weil.

A. Jackson Marshall, secretary of the Electric Vehicle Association of America, will take a trip across the country, in the interest of electric vehicles. He will leave New York City on May 19th, making stops at Columbus, Cincinnati, Louisville, St. Louis, Kansas City, Omaha, Denver, Salt Lake City, Los Angeles, San Diego, San Francisco, Portland, Seattle, Spokane, Minneapolis, Chicago, and arriving back at New York City on June 24th.

J. A. Innes, for the past 2 years in charge of the motor truck department of the Chicago Pneumatic Tool Company, in the Philadelphia territory has assumed the management of the Philadelphia branch of the Chase Motor Truck Company, succeeding A. E. Fisher, who resigned to take up another line of work. Extensive improvements will be made in this branch, and the territory comprising eastern Pennsylvania, New Jersey, Delaware, Maryland and the District of Columbia will be served by the Philadelphia organization.

Highland Body Manufacturing Company, manufacturers of truck bodies, established branch at 728 South Fourth Avenue, Louisville, Ky., with A. J. and E. G. Schoen as managers.

Timken-Detroit Axle Company, Detroit, is erecting new forge shop and power plant which will double its capacity for drop forgings, etc. The site of the new buildings is 1000 ft. long and 500 ft. deep, and when finished, the present forge will be moved into them, leaving the ground now occupied by the forge shops free for a four-story brick addition, which is being contemplated.

H. J. Koehler, S. G. Company, Newark, N. J., reports that it has sold three of its Jitney 'Bus models to Pensacola 'Bus Company, Pensacola, Fla., and one 'bus to each of the following:

McKay Company, Lakeland, Fla.; Charles V. Kirkland, Utica, N. Y.; H. Goldman & S. B. Flauman, New Haven, Conn.; Solan A. Stein, Reading, Pa.; E. L. C. Baldwin, Providence, R. I.

The CCJ has most advertisers because it gives them biggest returns

What Was Accomplished at the Meeting of the S. A. E. Standards Committee

By HERBERT L. CONNELL

MUCH has been done by the Standards Committee of the Society of Automobile Engineers in establishing standards and recommending good practice relative to motor truck, as well as pleasure car design, and the quarterly meeting of the committee in Detroit, April 20th to 25th, marked still further progress along these lines. A feature of this meeting was the putting into operation of the new rules of procedure, which requires that the divisions submit written reports to the committee as a whole. If the recommendations of a division are accepted by the committee it means that they are then sent to the Council of the society, and if again approved the matter comes up for final action at the next national meeting of the society.

Truck Spring Tests

One of the divisions dealing largely with truck units is the Spring Division, whose chairman is C. W. McKinley. Among the points it presented was the further explanation of the method of testing spring eyes for parallelism. Blue prints were offered, showing just how the test is to be made by placing 3-ft. rodes in the eyes. Last winter the report of this division was put over, because of the lack of attendance at the time it was presented, but it is probable that this test and other matters relating to springs will be adopted by the society at the coming summer meeting. Progress was reported on the work of the division in relation to head dimensions for the center bolts of commercial car springs, leaf tests, clip spacing, etc., but no definite recommendations were made.

Defining Headlight Glare

Headlight glare has become the subject for many city ordinances, and in one case, at least, is covered by a state law. At first thought, this subject might seem to be purely a pleasure-car problem, but it must be remembered that there are more and more trucks being operated at night in such lines as the creamery, transfer and package delivery, to say nothing of the jitney service. It is, therefore, of great importance to commercial car owners that a standard definition and test for glare be established, so that they may be relieved of the constant fear of demoralized schedules through the whim of the corner policeman.

Though Mr. Riker's division does not feel that it lies within its province to standardize any particular form or type of anti-glare device, it is undertaking the development of a standard definition and test of glare, which can be used with like and definite results in any part of the country. The Sub-division on Limitation of Headlight Illumination, under Chairman Alden L. McMurtry, has already tried out several tests and has found one which has given very uniform results when tried under different conditions and by different observers. This test depends on the ability of reading an illuminated sign while looking at the headlights from a certain distance and for a certain length of time. It is expected that all the details of the test and of the apparatus for carrying it out will be in shape for demonstration and action by the society at the coming summer meeting.

Too Much Light

The discussion of the glare or dazzle situation developed into an experience meeting. R. J. Nightingale told of being stopped repeatedly in Cleveland, and when he asked if the lights were glaring the officers had to admit that they were not, but complained that he had too much light for city driving. A number of the members thought that tilting the light so that the main beam struck the ground was a satisfactory method of cutting out the glare in the eyes of others on the road, but they had also experienced the complaint of too much light, rather than of actual glare.

Police Commissioner Gillespie, of Detroit, gave some of the committee men his views on the situation, and although many of the engineers did not agree with him, especially in his statement that the city and country problems were the same as to glare, the interview was most interesting as typifying the attitude of police department officials. One of his most interesting statements was that under his present rules the personal judgment or misjudgment of the complaining officers was entering too largely into the enforcement of the ordinance against glaring headlights and that he would welcome and adopt a standard test recommended by the S. A. E.

The report of the Electrical Division also covered matters relating to the arrangement of starting motors in relation to flywheel drives, fuse dimensions, and the standardization of bulb and plug ends. The division deemed it unnecessary to give the length of the ferrule in the fuse standard in the data sheets soon to be issued although this was approved at the last meeting of the society. The main item presented for submission to the Council and society was that relating to bulb and plug ends, for it has been found advisable to standardize these as well as the sockets into which they fit, which latter were standardized some time ago. This recommendation was favorably acted upon. It is worthy of note that the committee has made a distinction between the use of the words lamp and bulb, the former being the metal shell with reflector bulb, etc., while the latter is only the light bulb itself.

Iron and Steel Report

Mr. Zimmerschied's Iron and Steel Division reported on the vanadium content of steels and on specifications for steel castings, which latter, of course, particularly interests the truck industry. These two subjects were passed by the committee for submission to the Council. Progress was also reported on the work of collecting data on the physical properties of the S. A. E. steels.

Small Carburetor Fittings

Carburetor flange dimensions for ½, ⅝, 2½, and 3 in. nominal sizes were recommended by the Carburetor Fittings Division, headed by J. J. Aull. The addition of these very small and large sizes will make the S. A. E. carburetor standards very complete. The report, which also covered center to face dimensions on side outlet carburetors, was favorably acted on by the committee. Regarding the matter of hot-air stoves cast with the exhaust

Springs Division, Which is Considering a Number of Standards Affecting Truck Springs

At Detroit those present were: A. C. Bergmann, Efficiency Engineer Standard Oil Company; Chester E. Clemens, Mechanical Engineer Perfection Spring Company; C. W. McKinley (Chairman), Chief Engineer Willys-Overland Company; C. F. W. Rys, Metallurgical Engineer, Carnegie Steel Company; and C. V. McRaig.

The CCJ has most readers because it gives most information

manifold, it was decided to give the subject further consideration before making a formal report.

To Drop Taxation Formula

Prof. D. L. Gallop reported that his division wished to be relieved of the task of developing a taxation formula which would cover all vehicles and at the same time be fair to all from an engineering basis. Careful study of the subject by the division has shown that such a formula, based on the relative road destruction of the different highway users, would contain a dozen or more variables, covering the kind of power, the speed, weight, class of service, size and type of tires, length of time on the road, the class of service, etc. Of course such a formula would be utterly unworkable, for no state department could take the time to figure it out for each vehicle to be licensed, whether pleasure car, truck or horse and wagon.

As a suggestion only, the report mentioned the possibility of taxing fuel at so much per gallon. So far as engine-driven cars and trucks are concerned this would be a very good solution of the problem, for all the elements which enter into the road destruction are directly related to the amount of fuel used in each case, i. e., load, speed, time on road, etc. This would not cover the electrics and horse rigs, however, and it was for formula to cover all vehicles that the committee had been asked.

Governor Drives Coming

Several important matters are in the hands of John Utz's Miscellaneous Division, among them being a proposed standard for piston ring and groove widths. A chart was presented giving five widths of rings to cover the range of piston diameters from 2½ in. to 7 in. This part of the report was passed by the committee. More work is to be done by the division in relation to a speedometer end standard. This will not be for front-wheel drives, which were never satisfactory for trucks, and which are losing favor for pleasure car work, but will be for drives from either the transmission or engine. Beside being used for driving speedometers it was suggested that a standard drive of this nature through either the transmission case or engine crankcase could be very easily used for the driving of governors on all classes of commercial cars.

Cotter pins and fan belts have also received the attention of the Miscellaneous Division, with the result that definite recommendations were made to the committee on these subjects. From several hundred sizes the cotter pin list has been brought down to less than 50 sizes, which is sufficient to cover the requirements of S. A. E. bolts, S. A. E. clevis pins, and U. S. Std. bolts. The sizes include both a long and a short series. In the matter of fan belts only the flat type has been considered for standardization, four widths from ¾ to 1½ in. being settled upon.

Tire Test Wanted

A. J. Slade opened a lively discussion when he made a report for his Electric Vehicle Division on the subject of an easy test for solid tires. The test suggested is that of dropping a small weight on the tire and noting the distance it rebounds in the tube. This is very much like the usual sclerescope employed in measuring the hardness of metals. The greatest objection to this test came from the representatives of the tire companies, who did not believe that the mere measurement of resiliency told the story of the worth of a solid tire.

International Tire Sizes

Although any suggestion of the influence of the present war on the subject was carefully left out of the report and discussion, it is probable that the lack of an international tire standard has been more keenly felt by American truck makers during the last 6 months than during the whole past history of the industry. At any rate the subject of such a standard for both pneumatic and solid tires is under consideration by the International Standards Division, which is headed by A. L. Clayden, formerly of England. It is the idea of this division to start an educational campaign among the European makers and users. This will be done by literature showing the advantages to be gained by such tire standards and the proposed details of the standards will be left to literature which will be issued by the division later on.

GOODYEAR PARTNERSHIP PLAN MEETS WITH GREAT SUCCESS

Goodyear Tire & Rubber Company, for the past 10 years, has followed the policy of making "young partners" of such of its employes as have shown special ability and rendered highly efficient service by making them common stockholders. At the present time, there are 235 of these young partners. The Goodyear people have had such success with this policy that it will be extended, and a stockholders' meeting was held on June 1 to authorize an increase in the common stock, as there is no available common stock for the purpose of distribution.

In the past, the company has disposed of its stock to employes on the basis of five-year contracts, simply setting the stock aside in the beneficiary's name, and permitting dividends, cash and stock, to accumulate to the end of the period, when settlement is made. The employe really purchases the stock at par, though most of the payments automatically take care of themselves.

The plan has been a great stimulus to loyalty and ambition, and intelligent service. Men, realizing that they were stockholders, with stockholders' responsibilities, have given a different quality of service than otherwise.

ASKS FOR TRUCKS FOR ORPHANS' DAY

The Orphans' Automobile Day Association, of New York City, is sending out an appeal for the use of trucks to carry the little ones on their annual outing to Donnelly's Grove, College Point, L. I., on Thursday, June 3. Cars and trucks will be needed between the hours of 8 a.m. and 6 p.m. on that day. If it is impossible to enter a truck, cash contributions with which to hire trucks would be very acceptable.

NEW MOSLER FACTORY

A. R. Mosler & Company, of Mount Vernon, N. Y., has completed the transfer of its plant to new quarters, which is more than four times the capacity of the previous factory. The new plant is located in New York City on the Mt. Vernon border line, beside the tracks of the New York Central Railroad, with every facility for quick deliveries, the company is now in a position to fill orders with more dispatch than ever.

CANADA GROCER WANTS TRUCKS

A firm of wholesale grocers in Canada has requested an American consular officer to supply prices and full information relative to two-ton motor trucks. Prices should be quoted f. o. b. destination. Those interested can obtain further information by writing the bureau of Foreign and Domestic Commerce, Washington, D. C., or any of its branch offices mentioning file No. 16469.

Packard Motor Car Company is to erect a three-story addition to its plant on Concord Avenue, Detroit, which will be of reinforced concrete, and 52x113 ft. in size, costing $10,000.

Master Carburetor Corporation, Detroit, has purchased the real estate and plant of the American Air Compressor Company, 1523 Fort Street, W. The offices at Woodward and Hancock Avenue have been closed, all business being transacted from the factory.

Kelly-Springfield Tire Company, New York City, elected the following directors: Van A. Cartmell, F. A. Seaman, Austin Poole, Stephen Peabody, Gustave Maas, A. J. Scheuer and J. Oppenheim. A resolution was passed authorizing the setting aside of a sum to be distributed among officers and employes in a profit sharing plan, providing that 10 per cent. of the net profit above $1,000,000 be used in the fund.

Universal Motor Truck Company, Detroit, Mich., recently disposed of its machinery, parts, patterns, etc., to the Universal Service Company, which will continue to manufacture the trucks formerly made by the Universal Motor Truck Company. However the latter company is still looking after its own accounts and bills receivable. Machinery, equipment, etc., is being purchased by the Service Company on contract.

Remy Electric Company, Anderson, Ind., has recently erected the twenty-second unit to take care of the steadily increasing business. In keeping with the policy of the company to preserve intact all jigs, dies and fixtures used in the manufacture of its products, a portion of the new building will be occupied by additional safety deposit vaults for these tools. The remainder of the building will be devoted to additions to the punch press and automatic machine departments.

The Champion Spark Plug Company, Toledo, Ohio, has taken over the entire business of the Frontier Specialty Company, of Buffalo, N. Y. By this act the controversy over the priming spark plug comes to an end, the suit brought by the Frontier people against the Champion Company in November, 1914, for infringement of the Simms and Shea patents beng dismissed. The licenses issued by the Frontier concern, covering its priming plugs, will remain in force under the same conditions as before. The Champion Spark Plug Company will manufacture the All-in-One plug.

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

Importance of the Commercial Car to the Parts and Accessory Manufacturer

DURING the past year or two, the fact has frequently been brought to our attention that the motor car makers and the manufacturers of motor car accessories generally have failed to realize the importance of the commercial car branch of the industry.

We are continually told by new manufacturers, starting in to produce commercial cars, that it is impossible for them to interest the old line manufacturers of parts in their wants, and they are, therefore, compelled to either find a new man to make parts for them, or make arrangements to manufacture them themselves.

Again, we have been told that the number of standard parts for commercial cars which can be bought on the market is very small.

When a manufacturer has decided to make one or two sizes of motor delivery cars or motor trucks, and attempts to buy stock parts suitable for these, he has a very difficult time securing what he needs.

The whole reason for this is that the parts makers generally have given very little attention to the needs of the commercial car field. Most of them are so busy with their continually increasing orders for the pleasure car branch of the industry, that they have not had time to size up the commercial car situation.

They have not stopped to consider that the commercial car industy is growing by leaps and bounds—especially, in the past year has it grown, because of the impetus given it by foreign orders. If we compare the growth of the commercial car industry with that of the pleasure car industry, it will be found that at the present time, the commercial car industry is on a par as to number of cars built with the pleasure car industry in 1906.

In 1906, there were approximately 70,000 pleasure cars built. In the year past (1914-1915) there were approximately 70,000 commercial cars built. In the year 1905, the pleasure car output was 38,000, and the commercial car output for 1913-1914 was approximately 44,000 cars.

Trucks are Trumps

Is there a man in the industry to-day, who has been connected with it since 1905, who cannot recall the situation at that time in the pleasure car field? At that time, every parts maker realized to the full extent what the growth of the industry was to be, and there was even greater activity and competition among them, to secure a leading position in the parts making trade at that time than there is to-day. Everyone in the industry realized what a tremendous business it was destined to be.

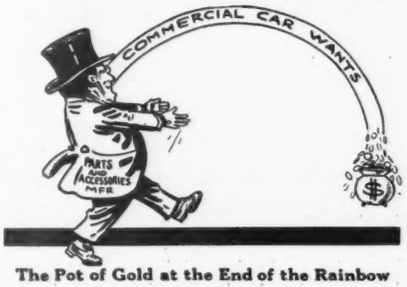
Yet, to-day, with the commercial car industry as fully developed as was the pleasure car industry of that day, there is very scant attention being paid to the manufacture of commercial car parts.

The increase in the production of commercial cars is now as rapid as it was in the pleasure car industry when it was at the same stage of development at the time above mentioned. This is proven by these figures:

	Pleasure Cars
1905	38,000
1906	70,000
1907	90,000
1908	110,000
1909	127,000
1910	170,000
	Commercial Cars
1914	44,000
1915	70,000
1916	85,000 to 90,000

These figures for 1908, 1909 and 1910 will more than be equalled by the natural increase in production of commercial cars during the coming 3 years.

How is it, with these facts before us, that the parts maker continually says: "Oh, I don't want to bother with commercial



The Pot of Gold at the End of the Rainbow

car business—it is too small. I can't afford to figure on 200 and 300 lots. I am building in 20,000 and 30,000 lots."

If the parts maker who is so busy on pleasure car parts does not care for this kind of business, it simply opens an opportunity for new manufacturers of parts to start in, and in the very near future, these old parts makers will find that they have giant competitors, as there is no doubt whatever that their own growth of 8 and 10 years ago in the pleasure car line will be duplicated in the commercial car line within the next 2 or 3 years.

An examination of the United States census figures will disclose the fact that the manufacture of horse drawn trucks and delivery wagons has not yet been seriously reduced by the production of motor truck and motor delivery wagons. The figures are as follows:

	Horse drawn Wagons and Trucks
1899	570,428
1904	643,755
1909	587,685

Later figures are not available. In 1909 there were less than 20,000 commercial motor cars built, and in 1914 this had increased only to 70,000, whereas the natural increase in the demands of the country as shown from 1899 to 1904 are 73,000 business vehicles.

The production of commercial motor cars, therefore, has thus far no more than balanced the normal increase in the consumption of business wagons.

It has not yet made any appreciable inroads into the great bulk of horse drawn wagon production.

Opportunity Knocking at Your Door

The time is rapidly approaching when commercial motor cars will replace all horse drawn business wagons just as horse drawn pleasure carriages have been almost completely withdrawn.

When this time arrives there will not only be the 587,000 yearly production of horse drawn wagons to replace, but the 7 or 8 millions of horse drawn business vehicles that are in actual use in the United States to-day that must be replaced.

This awakening is near at hand, it may be looked for with the next period of prosperous times which is now just beginning and we will not be surprised to see the records of pleasure car production for 1908, 1909 and 1910 more than equaled by the commercial car production of 1916, 1917 and 1918.

Let us estimate the probable output of commercial car parts during the coming year. We will not estimate on 90,000 cars, we will estimate on 70,000 or 75,000 cars, which everyone will admit is very conservative.

Taking this as a basis and taking a very small average price for the various component parts which enter into the make-up of the commercial car, we have the following figures as the estimated value of parts in commercial cars for the coming year:

Tires—	
for New Trucks	$ 7,500,000
for Trucks in Use	24,000,000
	$31,500,000
Engines	9,500 000
Rear Axles	7,500,000
Ball and Roller Bearings	6,000,000
Bodies	6,000,000
Transmissions	3,750,000
Differentials	3,250,000
Front Axles	2,600,000
Radiators	3,000,000
Frames	2,000,000
Wheels	2,000,000
Recording Instruments	2,000,000
Springs	1,750,000
Steering Gears	1,500,000
Magnetos	1,500,000
Clutches	1,250,000
Speedometers	1,000,000
Fenders	550,000
Hoods	450,000
Dash Assembly	600,000
Universal Joints and Shafts	450,000
Carburetors	550,000
Tanks	450,000
Speed Controllers	250,000
Spark Plugs	100,000
Lamps	500,000
Horns	150,000
Batteries	350,000
Tool Sets	400,000

This list totals almost $70,000,000 worth of parts, and yet does not contain a number of very important items, such as worm

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

gears, jackshafts, brake drums, brake linings, chains and sprockets, radius rods, piston rings, and a hundred other small parts and accessories. Neither does it include electric motors and electric batteries and controllers used on the electric motor trucks, nor does it include the thousands of special dumping bodies and 'bus bodies, etc., which will be used, and there is no allowance made in the above for self-starters, which will undoubtedly be applied to nearly every commercial car eventually.

The self-starter is as important an item on a commercial car as it is on a pleasure car, and there is not a pleasure car maker to-day who would think of putting out a new car without a self-starter, either as a standard equipment or an option.

When self-starters become a feature of commercial cars, that will mean that $5,000,000 will be spent for self-starters the first year that it is an accepted feature. There are other new parts which will run up this total to immense figures.

The question is—Who is going to take care of this immense business? Will the parts makers, who are now in the field, take care of it, or will they turn it over to new manufacturers?

We wish to again impress upon our readers that these figures are conservative. They are very low in some instances. They are not based upon the maximum number of cars, nor are they based on the maximum cost. Minimum figures are used throughout.

KANSAS CITY FIRMS BEING CONVERTED TO THE USE OF DUMP-BODY TRUCKS

By W. D. MENG

DUMP body trucks are not in use as generally as might be expected, but the unqualified success with which they have been used by certain coal companies and sand dealers gives reason to believe that other concerns will soon begin their use as a means of meeting the competition which has been produced by the quicker and cheaper deliveries of the companies now using dump body trucks.

The Kansas City Sand Company, the Stewart-Peck Sand Company, the Bell Coal Company, the Central Coal & Coke Company, and the Metropolitan Street Railway Company comprise the list of firms operating these trucks, the street railway company having lately begun the use of a Knox Tractor and Bull Dog Trailer, with automatic dumping bed. The two sand companies own Pierce-Arrow trucks. The Bell Coal Company is using a White, and the Central Coal & Coke Company operates two Pierce-Arrow five-ton cars.

The Kansas City Sand Company uses two trucks, but makes them do the work of five or six non-dumping trucks through keeping the machines constantly on the street during the working day. The Central Coal & Coke Company has four five-ton dump-body cars in use in addition to other trucks and wagons, and like the sand company, makes the dump-body cars do twice or three times the amount of work which is accomplished by the other type of trucks. These two firms have taken the lead in giving their customers rapid delivery service. They have not stopped with the expenditure of money for trucks which can be unloaded in the shortest possible time, and which cover the ground at a good speed. They have added to the usefulness of their delivery equipment by providing a method of quick loading, reducing to the minimum the time in which the trucks must be kept standing.

Browning crane loaders, with half-ton clam shell buckets, are important units in the delivery system of both companies. The loading apparatus removes the coal or sand directly from the railroad cars to the trucks, eliminating the expensive process of shoveling from the cars and later shoveling a second time into the truck or wagon. These companies consider the saving of time thus effected, a sufficient advantage in itself to justify their first expenditures, but the management in both cases also affirms that they have reduced their hauling costs.

The managers hesitate to make known the actual saving that results by their system, since they know that their competitors will be quick to take advantage of their experience when it is realized that dump-body trucks are the most economical, and they admit as much. An officer of the Kansas City Sand Company declares that his firm is filling rush orders continually, large and small, which his competitors cannot take from him because they are not equipped to give rapid service. He stated also that his experience has shown that another great advantage is that of being able to make rapid and frequent deliveries of sand on large contracts where sand must be hauled in great quantities. A truck can be loaded in 2 minutes with the Browning loader. This makes it possible for the two dump-body trucks to do the work which would require a continual procession of wagons and teams if hauled by the old method.

No actual records of cost of operating their trucks has been kept by any Kansas City company, but their worth is summed up in a few words by Frank C. Peck, president of the Stewart-Peck Sand Company, who said:

"We could not do without them, especially when business is heavy. Our company has five Pierce-Arrow trucks with dump bodies. They render us very efficient service in serving a customer who has placed a rush order. It is a big advantage, too, to be able to shift them around from one yard to another according to the needs of the moment. We have found them very dependable."

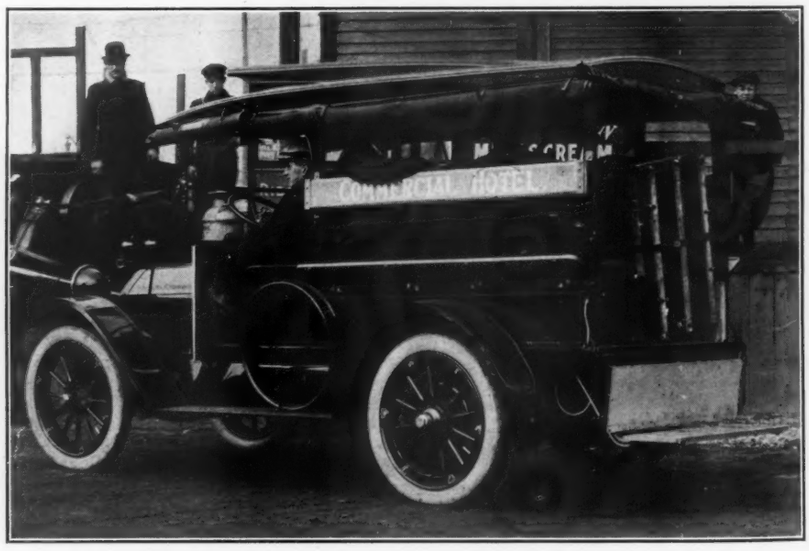
The Bell Coal Company has used the White truck for about a year with the same success as other companies report. This firm has no means of loading but by shoveling, and still has found the truck economical. The street railway company has twelve gasoline and electric trucks of various models in service, but the Knox Tractor and Bull Dog Trailer is the only machine with the automatic dumping arrangement. A. E. Harvey, chief engineer of the company, states that the tractor operates at a lower cost than any machine which the company has tried. These figures are being based on a sixteen-hour hauling test.

To operate successfully in Kansas City, trucks must be able to negotiate frequent grades of from 3 to 6 per cent., and occasionally greater. They do it as a day after day occurrence, and carry capacity loads.

Wickham Brothers, Scranton, Pa., have taken the agency for the Chase truck.

Lobee & Son, 730 West Street, New York City, have taken the agency for the Chase truck. They formerly handled the Denby.

Ham Lamp Company, Rochester, N. Y., has been bought out by the R. E. Dietz Company, New York. Several of the Ham Company's dies have been shipped to the plant of the Dietz Company, where, in addition to the former Dietz line, several of the Ham styles will be manufactured.



Studebaker Combination Station and Baggage Car

Fitted with upholstered seats and backs. Seats are in two sections, so that passengers can be carried in the front half of the body and baggage in the rear. Intended for station wagon, picnic and farmer uses.

THE COMMERCIAL CAR JOURNAL

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(Signed) C. A. MUSSELMAN, Business Manager.

Sworn to and subscribed before me this 16th day of March, 1915.

(Signed) GEORGE H. SHEVLIN, Notary Public.

(SEAL) (My commission expires April 1, 1917.)

Note:—In regard to Section 2 of the Act mentioned above, the Chilton Company does not accept payment, directly or indirectly, for any editorial or other matter printed as news.

RESPONSIBILITY OF THE PARTS MAKERS IN SELLING TO IRRESPONSIBLE CONCERNS

PARTS makers are naturally as anxious for business as manufacturers in any other line. Neither are they gifted with second sight beyond the ability of other manufacturers. Nevertheless, there should be some well-defined practice among the parts makers governing the sale of truck parts to small and irresponsible concerns.

Parts makers who are not as particular as they might be, perhaps due to lack of systematic investigation or from anxiety for sales, sell the same units to individuals or irresponsible manufacturers that they do to the established, and what might be termed legitimate makers. True the prices are slightly increased, but not sufficiently to prevent these irresponsible manufacturers without organization or capital to put out four or five trucks with the same units in them as the established manufacturer, and at a lower price and in direct competition with his product. Too often this individual never makes more than a few vehicles and then fails, the unattached trucks being thrown on the market at a price with which the established manufacturer cannot expect to compete. Every year there are a large number of trucks placed on the market in this way, upsetting prices, and also when their manufacturers fail, upsetting the confidence of compete. Every year there are a large number of trucks make a great deal of trouble, and the parts makers are largely responsible for their existence.

We do not mean to say that the parts makers should never make a mistake in those to whom they sell their product, but we do believe that more thorough investigation and a more systematic and uniform method of handling sales to individuals or firms of questionable standing should be adopted. It is not demanded of the parts maker that he be a prophet, nor pick out while still in the incipient stage the future winner from the one who will fail within a few years.

There are, however, business methods by which the backing and general financial ability of new applications for truck honors can be judged, and the suggestion is made that the parts makers through their organizations, draw the line more closely and prevent loose selling of parts to almost anybody who is shrewd enough to write on suitable stationary, and pay for the parts upon delivery.

STANDARDIZED SERVICE AND WHAT IT MEANS FOR THE DEALERS IN THE TRUCK INDUSTRY

AFTER years of contention, misunderstanding and mis-application of the term service, it now looks as though the industry were going to apply a remedy for the abuses of service. The National Convention under the auspices of the N. A. C. C. took definite steps looking toward a standardizing of service as applied to commercial cars.

More than any other one feature of handling trucks, has service proven the mile-stone around the neck of the luckless dealer, and branch manager. Everything from no-service-at-all to the most impossible free service now exists in the truck business. It is with the greatest pleasure that we note a concrete definite movement to round up the loose haphazard and unbusiness like methods now in vogue.

Service has been the octopus whose many tentacles have wound about and sapped the life blood of profit from not only the firm selling trucks through branch houses, but also those operating through dealers. In handling such a monster as service, and its misapplications, it is surely best to draw the net more closely by means of standardizing and promoting uniformity of service, than to try to strike a death blow at once. The manufacturer is in an enviable position that can broadly cut out service, but there is a general feeling that the industry is still too new for the manufacturers and dealers to suddenly take such a step.

If the manufacturers persist in efforts to bring about a standard method of handling service and the dealers co-operate with them, it will be but a question of a few years

when the undesirable features of service will gradually be eliminated. As the industry grows older and the user becomes more familiar with the problem of motor transportation, service will be less and less of the monster which it has undoubtedly been in times past.

All attempts to standardize service, we believe, should be looked upon with favor by everybody connected with the business and every co-operation should be given to make it possible to agree on something definite. All will look forward with interest to the results of the work of the newly appointed committee which is to co-operate with the commercial vehicle committee of the N. A. C. C.

It is most surely one of the best steps toward the solution of merchandizing the commercial car that has yet been made.

Steel and Rubber Markets

Export Steel Orders Main Factor in Trade

The steel mills continue to profit from export orders in greater proportion than from domestic business. Since the first of May export orders have totaled nearly 100,000 tons, of which more than one-third is for railroad building. Domestic orders are not encouraging and the greatest activity is in bars and steel and iron pipe.

Quotations on May 10 were:

STEEL PRODUCTS PRICES

Bessemer steel, per ton, mill	19	00	a19	50
Open hearth, per ton, mill	19	00	a20	00
Sheet bars, per ton	20	00	a21	00
Steel bars, soft base, half ex-tidewater	1	31	a 1	36

The above prices are at tidewater in carloads and larger lots. For quantities less than 2000 lbs., but not under 1000 lbs., $2 per ton additional is charged, and less than 1000 lbs., $8 per ton additional.

SHEETS

The following prices are for 100-bundle lots and over f. o. b. mill; smaller lots $2 per ton higher.

Gage—	Black.	Galvanized.	Gage—	Black.	Galvanized.
Nos. 22-24	1 65	2 85	No. 28	1 80	3 30
Nos. 25-26	1 70	3 00	No. 29	1 85	3 45
No. 27	1 75	3 15	No. 30	1 95	3 65

IRON AND STEEL AT PITTSBURGH

Bessemer iron	14	40	a14	50
Bessemer steel, f. o. b. Pittsburgh	20	00	a	..
Skelp, grooved steel	1	12½	a 1	15
Skelp, grooved iron	1	50	a .	..
Ferro-manganese (80 per cent.), seaboard	78	00	a95	00
Steel, melting scrap	12	50	a .	..
Steel bars	1	15	a 1	20
Black sheets, 28-gage	1	75	a 1	80
Galvanized sheets, 28-gage	3	25	a 3	30
Blue annealed, 10-gage	1	30	a 1	35
Tank plates, ¾ and heavier	1	10	a 1	20

Crude Rubber Steady

No material change in the rubber market has taken place since our last report. Manufacturers continue to restrict their purchases to comparatively small lots.

Quotations on May 10 were:

Up-River—			
Fine	60	a	..
Coarse	46	a	..
Island—			
Fine	54	a	55
Coarse	31	a	..
Cameta	33	a	..
Caucho Ball—			
Upper	49	a	..
Lower	Nominal		
Centrals—			
Corinto	45	a	..
Esmeralda	45	a	46
Guatemala, slabs	42	a	43
Mexican—			
Scrap	43	a	44
Strips and scrap	43	a	..
Guayule	..	a	..
Balata—			
Sh't	53	a	58
Ciudad—			
B'k	..	a	..
Trinidad—			
B'k	Nominal		
Africans—			
Massai, red	..	a	..
Red C'go	Nominal		
B'k C'go	..	a	..
Soudan—			
Niggers	Nominal		
Gambia, prime	..	a	..
East India—			
Smk, sh'ts	61	a	62
Ceylon—			
Bis sheets	58	a	59
Pale crepe	60	a	..
Pontianac—			
Prime plantation	..	a	..
Palembang	..	a	..

DOMESTIC SCRAP RUBBER

Tires—			
Automobile	5	a	..
Bicycle, pneumatic	3	a	3¼
Wagon and carriage, solid	4½	a	..
Inner tube	12	a	14

THE TRUCK AND THE FARMER

By George W. Grupp

LIVING in an age of rush and hurry to get ahead of our fellowman, machinery has played a very prominent part in this great state of activity through which we are passing. And the farmer has also taken his place in this procession of evolution. He has replaced the spade and wooden plow with a motor driven steel plow; the sickle and scythe with a reaping machine; the hoe with a potato machine; hand seeding with machine seeding; hand weeding with mechanical devices, etc. And now comes the motor truck. Does the farmer really need a truck? He has long realized the material advantages of supplanting his laborious, tedious and primitive hand methods for mechanical ones, but the question is now, will the farmer arise to the occasion and welcome the motor truck? Partially this has already been answered, as a great many farmers have welcomed the motor truck to their mechanical fold. He has begun to fit up his automobile with a box attached to the rear of the seat for the accommodation of carrying produce or milk to the various points of shipping.

These facts make it self-evident that the farmer is keenly alive to the imperative need and advantages of the truck over the horse-driven vehicle. All that the average farmer of to-day wants is an opportunity to witness some of these advantages of motor trucks in actual operation. And once he sees its great qualities demonstrated, he will at once become a great motor truck enthusiast.

But briefly really why should the farmer own and operate a motor truck on his farm? First, all farmers know that for a number of years they have been confronted with a very serious problem, which has been largely overcome by the organizing of farmers' associations. Now briefly the problem was and is this: Before the introducing of motor trucks to the farmer who lived within a radius of 20 or more miles from the city, the farmer could not afford to spend time to drive a horse-driven vehicle to the city to market his wares, therefore, he used to ship his wares by freight. Then when the commission merchant sent his check to the farmer, he would always deduct a certain amount from the original figures quoted to the farmer by explaining in his letter that the produce was damaged during transit whether this was true or not, thus the farmer was the loser. Now with a motor truck this evil was largely overcome by farmers living within this radius. With a motor truck he is able to deliver direct to the commission merchant. The produce is delivered a great deal quicker, it is fresher and he can afford to demand a greater premium for his produce. Besides he has overcome the fake excuse of the commission men that the goods were delivered damaged or spoiled.

The cost of motor transportation is only a slight increase over the railroad charge, but the time saved in delivery, the higher price for his goods more than offsets any extra expense incurred in a motor truck.

Then again take the farmer who makes a daily trip to the city with truck farm produce, would he benefit? Decidely yes. If he has a motor truck he does not have to get up at 4 a.m., but 6 instead, and besides be able to deliver his goods on time at the commission house.

Besides being a delivery vehicle, the motor truck may be made to do many other things. With the mere attachment of a winch the truck could be made to hoist the hay in the loft during the harvest season. The engine could be made to pump the water out of the well, etc. With the aid of convertible body, the truck could be used to haul malt and to carry cattle to the market.

Another advantage of the motor truck over the horse-driven vehicle is that it does not eat food while there is nothing doing during the winter months. It occupies less space and this space could be then used for the storing of hay, corn and other articles.

In short, the non-using motor truck farmer will have to dispel his false notion about the motor truck if he wishes to keep pace with the times and his fellow farmer; otherwise he will soon be outstripped.

The CCJ has most readers because it gives most information

Get-Together Convention of Truck Men, at Detroit, Under Auspices of the N. A. C. C.

A Representative Gathering. Co-operation and Standardization of Service; Time Payments and Ninety-Day Guarantee; Keynotes of Meeting

THERE are few if any industries, which have shown the hearty co-operative spirit and friendly feeling between competitors, and manufacturers of competing vehicles than was exhibited on the part of the truck interests gathered in convention at the Hotel Statler, Detroit, Mich., on May 5 and 6.

It was indeed a representative gathering, presidents, vice-presidents, general managers, engineers, etc., of the leading manufacturers of the country being present; in fact, there were no outsiders in the meetings, the attendance being confined to truck manufacturers only.

The keynote of the convention was sounded in the address of welcome by Hugh Chalmers, as Charles Clifton, president of the N. A. C. C., was unable to be present. His subject was: "Co-operative co-operation." In his remarks he brought pointedly to the attention of the makers, that for success all must co-operate, that they must not be like a sponge taking in all they could get, and requiring to be squeezed before they gave out anything. All were urged to take part freely in the discussions and give facts concerning the industry, and their particular methods. Candor of expression, and the freedom with which the various members present discussed their costs, their discounts, their troubles, and their successes would have been a revelation to many who are not familiar with the splendid feeling which exists between the members of this newest and largest industry.

Aside from co-operation, the chief business centered on the question of standardizing service. The discussion took the form of a debate between Alvin McCauley, vice-president of the Packard Motor Car Company, and W. L. Day, general manager of the General Motors Truck Company. These two firms represent probably the extremes of the industry, the Packard advocating standardized service, while the General Motors Truck Company claim to have discontinued service altogether.

Service to be Standardized

The result of the convention was the appointing of a committee for the purpose of recommending a standard service policy to be given by the manufacturers to their agents. The feeling was very general that if such a result could be brought about, the convention was well worth what it had cost its promotors and those attending in time and expense.

The standard warranty as proposed by the commercial vehicle committee was also adopted, while shows in any form whatever were completely turned down, at least for the present.

Early Wednesday morning the representatives of truck manufacturers from all parts of the United States began to gather and register. There were no business sessions in the forenoon, although the Board of Directors of the N. A. C. C. held a meeting. The first regular business, if it might be termed such, was the get-acquainted luncheon at 12.30 to 1.30 held adjacent to the convention hall, for the convenience of the members.

First Business Session

Following the address of welcome by Hugh Chalmers, Windsor T. White was elected chairman of the convention, and Al Reeves read some important announcements, and the meeting took up the first paper, "What Can Be Done to Improve Conditions in the Truck Business?" by John W. Van Allen, of the Atterbury Motor Car Company. He mentioned the need for a get together of the truck manufacturing interests, citing the convention of a

WINDSOR T. WHITE, Chairman of the Convention

year ago as an example of the interest shown by the makers. He advocated instruction and education, dealt with the subject of long time payments, and abuses of same, employment, and suggested improvements. Extracts of the paper will be found further on in this article.

In the absence of F. J. Trudell, H. T. Emerson, of the D. F. Poyer Company, led the discussion. He was against direct sales as a truck selling policy, believing thoroughly in the dealer, but that the dealer should be suitably instructed and guided. M. L. Pulcher, vice-president of the Federal Motor Truck Company, then took the floor, and very frankly stated the policies of his company, making an appeal to the others to be as free as possible and give the experiences of their respective concerns to those assembled. He said it was the wrong attitude for the manufacturer to continually go about with a piece of mistletoe pinned to his coat tails, and throughout the convention the "mistletoe policy" was thereafter referred to He also advocated the dealer and brought out the fact that the manufacturer can build much better trucks with the assistance and co-operation of the dealer than without it. The ninety-day guarantee he favored as against the 12 months. The maintenance of a list price and fair discounts, and the enforcing of the dealers as far as possible, selling at this price. He suggested a policy by which territory given to a dealer should revert to the manufacturer if the dealer proved his inability to handle it.

Service Coupon Booklet

An interesting method of handling the service question where there are no dealers or representatives was outlined by Mr. Pulcher as carried on by his company. In such instances a coupon booklet good for $200 worth of repairs at some local shop, with which the manufacturer had previously made arrangements, is given to each truck purchaser. He said that they preferred to do this, and in this way give a certain amount of service rather than sell a truck at $200 less. The slips are signed by the truck purchaser whose truck is repaired, also by the repair shop and mailed to the manufacturer who reimburses the repairman. These coupons are good for one year only, and the unused portion of the booklet is returned. He also mentioned the business co-operation of the members of the N. A. C. C. by licensing each other with all the patents owned by the Chamber, and emphasized the importance of a co-operative attitude among all members.

J. C. Millman, secretary-treasurer of the Stegeman Motor Car Company, made a plea for a standard guarantee, favoring the ninety-day basis. Parts makers must back up the ninety-day guarantee by a similar guarantee on parts. If 90 days cannot be agreed upon, compromise on a 6 months' guarantee, but arrange for all manufacturers to stick to it. On the subject of time payments, he said that their company sold on one-third down and the rest in eleven months, properly secured, and was against any time payment extending over a longer period. The fact that reputable manufacturers using the same parts often rate their vehicles at entirely different capacities, brought out the suggestion that there should be a committee to determine what is the capacity of a truck, and what is the capacity of a unit such an an axle, transmission, etc. Mr. Millman also strongly favored the dealer as against the direct selling policy, and advocated a standard form of selling, so that the public would know what to expect and suggested manufacturers joining the Chamber to assist in this work.

At this point, Chairman White made a few remarks on the desire of the Chamber to include in its membership all reputable makers.

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Pulcher remarked that the 6 months' guarantee by the parts maker was 3 months gone by the time the parts were incorporated in the truck, and the truck reached the dealer, so that they virtually amounted to a 3 months' guarantee. Mr. H. O. Bentley, of the Gramm-Bernstein Company, talked on the eviles of the parts makers selling to irresponsible small firms who build but four or five trucks which are placed in competition at a lower price with the product of a large maker using exactly the same parts, calling attention to the smallness of this business, and that it does not pay the parts makers. In answer to this E. T. Birdsall, president of the Kosmath Company, mentioned his experience in the parts business, believing that it will be very difficult to do anything about such a matter, as no parts maker is able to tell beforehand which of these small and apparently insignificant companies is going to be the big one of the future. He said if anybody can predict these things with accuracy they have got the second sight people backed off the boards.

The subject of "How Physical Problems That Militate Against the Economical Use of Trucks Can Be Solved" was the next paper, by David Beecroft, of the Commercial Vehicle. This subject was a very large one; in fact, too large to be covered by any one paper. Mr. Beecroft brought out in the first part the history and field for commercial cars, and then touched upon the various drawbacks, such as lack of loading and unloading facilities, indifference or ignorance of architects, inadequate roads, bridges, etc. Those slated for the discussion did not take part, but Mr. Pulcher suggested the gathering of data for co-operative use. Horine called attention to the fact that the cost figures must be gathered in the same way, including the same items to be of value. William P. Kennedy said that one of the difficulties was that the prospective user does not know the value to him in his business of using trucks, and that such information could be compiled and sent out by the Chamber.

The Used-Truck Question

The third paper of the session, by W. L. Day, "How Can the Used Truck Question Be Handled?" was short and to the point. He said there was no more reason for the truck manufacturers to have a used truck problem than there was for the shoe manufacturer to have a used shoe problem, that if the truck was still able to operate it was worth more to its owner as extra equipment and to take the place of other trucks, than any truck manufacturer can afford to pay for it. He said the second-hand business is a trade in itself. He said that his company did not trade in, and he might also add that their policy in this matter was not patented, and that he believed that this is the only way to handle the second-hand truck problem.

H. H. Hills, sales manager of the Packard Motor Car Company, in opening the discussion dealt with it from the standpoint of the dealer and offered as one solution the method of selling for the customer. He believes there is and will be a second-hand car problem, and that the manufacturer should assist the dealer wherever possible in handling it.

Victor L. Brown, president of the Sternberg Motor Truck Company, presented his discussion in the form of a paper which outlined some very good suggestions as to how the problem can be handled.

The method used by H. E. Wilcox, vice-president of the H. E. Wilcox Motor Truck Company, is to sublet a repair shop to some competent men to whom are turned over the trucks taken in trade, for the company's valuation of them. These he repairs and markets on his own hook entirely independent of the Wilcox Company. This scheme has worked out successfully.

Mr. Pulcher said that their dealers throughout the country were required each month to give them a list of the number of trucks taken in trade and all the other dealers were informed of same, which resulted in disposing of trucks where there was a demand for them.

Used-Car Central Market Report for Trucks

The methods of the Chicago Automobile Trade Association of handling second-hand pleasure cars by means of the Used Car Central Market Report, was clearly explained by Al Reeves, but the opinion prevailed that there were not yet sufficient second-hand trucks to make this system effective, but that at some future date the same methods could be used for disposing of old trucks. All agreed that the manufacturer should assist the dealer in handling the problem.

The Subject of Service

The fourth paper by Alvin McCauley, vice-president of the Packard Motor Car Company, entitled "Can Manufacturers Have a Standard Service Policy?" proved to be of most vital interest to the convention. The paper ably handled the subject, outlining the standardized policy as now used by that company, the details of which will be found in extracts of the paper further on in this article.

Henry Lansdale, vice-president of the Denby Motor Truck Company, led off in the discussion of the paper, stating that service is essentially a problem of the dealer, and suggested methods by which the manufacturer can assist the dealer. At this stage of the meeting, W. L. Day, general manager of the General Motors Truck Company, in a written discussion, criticised the service policy as outlined by Mr. McCauley, stating that free inspection at the agency was not equitable to those at a distance from the agency, who were unable to get their trucks there, but were charged with the expense of an inspector if sent to them. In general, he did not believe in any service policy whatever, and in a most frank and open manner he said that they in their business had cut out the cigarettes and bubbles, and all the fallacies such as service, which they inherited when they went into the automobile business. He believed that a free inspection increased the legal liability of the manufacturer or agent, in case of subsequent breakdown or damage. Mr. McCauley replied in vindication of the system, which was again replied to by Mr. Day, saying pointedly that the truck makers were too weak kneed to cut out service, and take the stand which they ought to in the matter.

Chairman White spoke of their method of arranging with good, independent repair shops to do this work.

A. B. Cumner, of the Autocar Company, talked on co-operation with the customer and claimed that manufacturers should guarantee defects in design as well as in material, and brought in the subject of the guarantee in connection with service.

John S. Clark, vice-president of the Autocar Company, in discussing the subject, cited a case of a tool machine manufacturer's replacing at considerable expense and trouble a broken part in a grinding machine, without any charge whatever, pointing to this as a policy which has made good in many lines, and advocated a liberal policy in service in the truck industry on account of its newness.

J. C. Millman suggested that the word "service" be replaced entirely by repair policy.

The subject so engrossed the meeting that it was already beyond the closing time, and it was voted to take the matter up again in the morning.

During the evening the members gathered for a theatre party at the Detroit Opera House.

Thursday Session: Service Topic Continued

The session was called to order by Chairman White, the subject first under discussion being the standard warranty. The adoption of this as proposed by the committee of the N. A. C. C. was finally put to a vote and was passed, and now becomes recommended practice for all Chamber members, and it is hoped that it will also be used by others in the industry.

To bring matters to a head, John S. Clark made a motion that a committee be appointed to study and report on a standard service policy. This was amended by John W. Van Allen that a committee from those represented at the convention be also appointed to work with the N. A. C. C. committee. E. T. Birdsall amended the amendment that this latter committee be chosen from members of firms at the convention, but not members of the Chamber. The amendments were accepted by Mr. Clark, and the matter was thrown open for discussion. A number spoke on the subject, the majority favoring it. However Vernon Monroe did not believe that the Chamber should go on record, while Mr. Day again repeated the manufacturers didn't have nerve enough to put a stop to service, and called attention to the increase in the financial standing of the General Motors Company since they had adopted the no-service policy. J. C. Millman made a strong plea for the standardizing of service, also Victor L. Brown, and M. L. Pulcher, who suggested that if a service policy was finally determined upon, it be printed in large letters, and framed in a massive frame and distributed to all of the dealers to hang on their wall. E. S. Foljambe called attention to the fact that service had been one of the things

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that had prevented the dealers from making money, that service among dealers was in a chaotic condition and that only by adopting some form of standard policy and gradually cutting this down, could the industry ever hope to arrive at the enviable position where the members could adopt the mistletoe policy. Mr. Reushau, sales manager of the Reo, agreed with Mr. Day. The latter, however, said that he had no objections to a committee on the subject, and at last Mr. Clark's motion as mentioned, that a committee of five from firms at the convention, but not members of the Chamber be appointed to co-operate with the commercial vehicle committee of the N. A. C. C. to formulate a standard service policy, and present same before the next meeting of the manufacturers. The motion was passed unanimously.

Dealers and Discounts

This momentous subject having been disposed of, the topic "Can the Dealer Make Money Selling Motor Trucks, and If Not What Is His Function?" in a paper by Robert O. Patton, truck sales manager of the Pierce-Arrow Motor Car Company, was taken up. In this paper, extracts of which are published in this issue, he advocated the dealer method of sales, and the co-operation of the manufacturer with the dealer in every way, to make his business successful. The discussion was to have been led by John S. Clark, who, however, preferred not to talk on the subject, as his company had largely thus far pursued the branch house policy. C. G. Barley, of the Harwood-Barley Manufacturing Company, not being present, F. B. Hutchinson, sales manager of the Kelly-Springfield Motor Truck Company, started the discussion. The subject of the discount to agents when trucks are sold into his territory from a distant point, was then brought up by Pulcher, also the Territory Versus No Territory method for agents. Robert O. Patton was then asked to state the Pierce-Arrow Company's method. He said that they did not assign territories to agents. If any agent is called upon to supply parts or deliver a truck in his vicinity, he is paid 5 per cent. of the 20 per cent. allowed the dealer who made the sale.

Pierce-Arrow Standard Guarantee

He spoke very favorably of the standard guarantee gotten out by his company, and which goes with each truck at the time of purchase to the buyer. This is elaborately engraved like a certificate, and states definitely exactly what the company selling the truck will or will not do, so that there is never any misunderstanding after the sale.

The policy of the GMC is just the opposite, to box the dealer in his territory and rigidly hold him there, not permitting a sale anywhere else, while the company itself is free to do national selling, the company giving 10 per cent. to any dealer into whose territory they put a truck.

Service Station or Branch *vs.* Dealer

Mr. Day said that it was not true that the dealer would have no chance to make money if the manufacturer himself could not make a branch pay, and cited as a proof the fact that on their service station in New York they lost on an average of $256 a month, until they finally contracted with the dealer to handle the whole thing, and that he had since cleared $800 a month.

M. L. Pulcher now took the chair, while Chairman White read his paper on the Advantages of Selling on Time Payments, in which he outlined a sane time policy. Vernon Monroe, president of the International Motor Company, talked on the time selling plan, believing that it has come to stay, and will grow in the future, and is a subject which must be met intelligently by the manufacturers. He had no inherent objections to the system, but to the abuses of it, and believed that the man buying is the one to finance the financial paper and insists on adequate protection for all time sales. He called attention to a method by which his company has circumvented the garage man's underlying lien. He said the time selling plan was a question of the

ALVAN McCAULEY
Vice President of the Packard Company, and whose paper on "Service" proved of vital interest

courage and brains of the credit department as against the pressure brought upon it by the sales department.

C. W. Squiers, Jr., sales manager of the General Vehicle Company, commented at length on the paper, especially on the class three as outlined by Mr. White.

J. C. Millman spoke of his company's methods, and said that when an agent introduced notes he gets only one-half of the commission at the time of the sale. The notes are collected through a bank. He suggested that the committee draw up a standard form for time payment plan, and get all manufacturers to give the same length of time. Mr. White emphasized the importance of monthly payments on the notes, and stated that in 10 years' business in selling sewing machines on time, that the loss had not been over 10 per cent. on the selling price, and had cost not over one per cent. John W. Van Allen introduced a note of warning and stated that the time payment plan must not be extended too far, or they would experience the same results as in the piano business where time payments have put many of the large companies out of business. He claimed that 12 months was too long, and that a manufacturer should receive the cost of manufacturing on the sale at once, and wait not over 8 months for the profit, this being paid in monthly instalments.

How They Do It in London

At this point, Mr. Smith, a dealer in American cars in London, was asked to comment on the methods in England. He said that they never took notes, the dealer usually receiving one-fourth down and 5 per cent. interest on the balance which was paid in monthly instalments, the title of the truck not passing to the purchaser until the final payment. He was surprised that price cutting was tolerated at all here, and said that the M. T. A., a representative body of English truck makers, blacklisted and practically put out of business anyone who sold at less than list price. After the reading by Al Reeves of a very humorous paper on war truck sales by Henry Caldwell, of the New York Times, the members adjourned for luncheon.

Afternoon Session

At 2 o'clock the afternoon session took up the paper by Vernon Monroe, "Why Service Conditions Should Be Investigated," the discussion being led by William P. Kennedy. Many good points were brought out, showing the advantages of thoroughly investigating before the sale.

Truck Shows Not in Favor

The paper by M. L. Pulcher on the question, "Is There a Need For Motor Truck Shows or Demonstrations, and What Form Should They Take," stirred up considerable discussion, practically all of it against shows of any kind, although the recommendation of Mr. Pulcher of an outdoor fall show with competitive events and demonstrations was favorably commented on by many. Al Reeves suggested Sheepshead Bay Speedway as offering a splendid place in the Metropolitan Section, calling attention to the tremendous national advertising value of such competitive events to those who entered, and particularly the winners. J. C. Millman favored assisting the dealer by exhibiting at State fairs. The sentiment in general, however, was decidedly against shows, and the vote on the subject was practically unanimous against holding any truck shows.

Third Session

The last session opened with the reading by F. W. Davis of the paper on "Standard Load Rating," by H. Kerr Thomas, assistant manager of the Pierce-Arrow Motor Car Company. E. T. Birdsall called attention to the closeness with which results of figuring by this formula checked with those of a formula for the same purpose given by the S. A. E. It was decided to have copies of the paper sent to the various members, so that it can be presented to their engineering departments for consideration, the matter again to be taken up at the next meeting.

"The Future of the Electric Truck," by P. D. Wagoner, president of the General Vehicle Company, was read by C. W. Squiers, sales manager of the company. In a brief discussion by E. C. Downing,

he called attention to the fact that the price which had always been a drawback to the electric was soon to be remedied by lower priced vehicles. The legal paper on the Clayton Act, and Powers of the Federal Trade Commission by Charles Thaddeus Terry, general counsel for the N. A. C. C., was distributed, but not read. The paper, "Limitation of Weight, Size and Speed of Motor Trucks for Preservation of Roads," by E. S. Foljambe, editor of the Commercial Car Journal, closed the session as far as papers were concerned.

Standard Service Committee Appointed

After a brief discussion, Chairman Clark announced the appointment of the following committee to co-operate with the commercial vehicle committee of the Chamber on the subject of a standard service policy. Victor L. Brown, president of the Sternberg Motor Truck Company; E. T. Birdsall, president of the Kosmath Company; Henry Lansdale, vice-president of the Denby Motor Truck Company; J. C. Millman, secretary-treasurer of the Stegeman Motor Car Company, and H. E. Wilcox, vice-president of the H. E. Wilcox Motor Company, all of whom are from firms not at present affiliated with the N. A. C. C.

After the usual vote of thanks, the chairman and the committees, the first Get-Together Convention of the Chamber, came to an end. There was a general feeling that announcement would be made in due time of another meeting, and also of satisfaction at the spirit of co-operation which had been shown throughout the convention. Extracts of many of the papers follow.

Extracts of Papers Read at the Convention

WHY SERVICE CONDITIONS SHOULD BE INVESTIGATED AND RECOMMENDATIONS MADE BEFORE SELLING A CUSTOMER

By VERNON MUNROE, President International Motor Company

A DIRECT and complete answer to this question would be: "Be-know before he sells his product whether or not it will result in credit to himself and satisfaction to the buyer," and in the motor truck business this usually requires some investigation.

We may certainly take it for granted that service conditions under which a truck is to be operated should be known to the manufacturer before the sale of the truck is made, if he is to recommend the particular type of truck suitable for the particular use, or if he is to advise the customer not to buy a truck at all, if that is the proper advice to give.

One principle applicable to all business that all will recognize and will admit is that the interests of the manufacturer and his customers are, in the long run, the same; that to sell a customer a truck which will not do his work, when perhaps a truck will do his work, is like selling a man a fur coat for use in Cuba or a straw hat for the Arctic circle. Too often has a sale been made to keep a competitor's article out of the market, without regard to the best interests either of the customer or the manufacturer, when it should have been realized that to get a competitor's truck into service when it could not operate successfully is less damaging than to put one's own product into such service.

For the purpose of bringing out more clearly the matter to be discussed, let me reword the question as follows:

How far should service conditions be investigated before a sale is made to a prospective customer, and what should be the nature and extent of the recommendations made?"

Thorough investigation of service conditions should be made to the point that will insure the manufacturer that his truck, when sold, will reflect credit upon him, will result in additional sales to the same or to other customers, and in profit to the particular buyer. It is not conceivable that there can be any marked difference of opinion as to the truth of this statement or as to the wisdom of this policy.

For our own sakes we must determine what is wanted in order to supply it; there must be no guess work about it; it is not a business of hopes and wishes; there is no mystery connected with it, and the sooner it is treated as a real business—a machinery business just like any other machinery business—the sooner this industry will be on the right track.

Now, investigations and demonstrations are necessary in the machinery business, and will always be so. They are necessary in our business and will always be so—investigations certainly, demonstrations probably—and to the point that investigation is necessary to satisfy the maker that the sale is a right sale, there can be no difference of opinion. Therefore, I think we are justified in saying that investigation and recommendations are unquestionably justified when carried only to the point of satisfying the manufacturer that his product, if sold, will do itself justice and prove satisfactory to the owner.

The question for discussion, on which there may be a difference of opinion, is how far one is justified in investigating for a prospect beyond the point of satisfying one's self as to the sale being a good one, and to what extent recommendations are advisable, especially as to the operating after purchase.

This seems to me to be a question solely of selling policy, of common sense and of good faith.

As a question of selling policy, we must consider the quantity of trucks which may be required by the prospect, the probability that a purchase will be made, the cost of the investigation, the difficulty of determining the truth and the good faith of the prospect.

I do not believe it to be a wise selling policy to investigate, instruct, recommend, without limit, partly because of the heavy expense which such a policy properly carried out would involve, and partly because I feel keenly that it is exceedingly easy for one to get into deep water—over one's head—when it comes to teaching the other fellow something about his own business. If one is fairly to avoid the latter difficulty, it will require the employment of an expert or experts of very unusual calibre who, while having a broad insight into all kinds of business, will also be masters of detail and competent to study and pass upon almost every form of transportation problem likely to exist.

Our salesmen should be of sufficient calibre to know, and to consider in selling, the axiomatic factor determining the wisdom of using motor transport in place of horse equipment—the volume of freight to be handled, the speed required, the road conditions, loading and unloading problems, seasonal conditions, number of working hours, and so on. If the salesman is honest (and we must assume he is, because if he is not, we are condemning our own management), if he is reasonably intelligent (which he must be or he will quickly eliminate himself from the business), he should be able to determine with reasonable exactness whether or not a sale is a good one in nine out of ten cases, and in the tenth, he should know enough of the situation to be able to determine which particular factor involved is outside his powers and report to the head of his department for advice and assistance.

Now this tenth case, in a very large proportion of cases, should be fairly clear to the head of the department and should require comparatively little further investigation, and not too much study on his part, I say should, because I believe that the vast majority of cases will be covered under my claim that investigation is justified and, in fact, necessary to determine the fact that the sale is a good one from the point of view of the maker. We may, therefore, agree that in determining further the point to which investigation is justified, it is certainly justified as long as it can be done by the salesman and by his immediate superior.

There will, however, always be a large class of cases which will require more knowledge than is possessed by the salesman, more time than the department head has to devote to them, which must be studied by what, in our advertising literature, we are pleased to call our traffic departments.

Now, in our traffic departments the commodity most important of all is what is required in every branch of our business; namely, common sense—and then more common sense—and then still more common sense. It is a department where, I believe, it is easier to go to extremes than in any other connected with our industry, except publicity. The reason for it is found, I think, in the fact that first the traffic engineer must create a job for himself, and unless he is enthusiastic and hard working, he will not succeed, and if he is, he will likely outrun the safe limits of his duty.

Then, too, the demands upon a traffic department, made by the sales department, will always be heavy and unless the object of investigations is kept clearly in mind, both by the traffic department and the head of the sales department, the same result will be met as has been met so widely in our service department; namely, a heavy expense built up around service for the sake of assisting in the selling, with results of certain injury to the service and doubtful value to the selling.

There is, however, a large class of cases which must be treated on their merits from the viewpoint of developing new fields, and I will attempt briefly to outline a few.

A great railroad company with congested terminals is considering the wisdom of delivering freight by motor trucks instead of by the truck men handling freight for the various consignees. Here is a subject for the deepest and most careful study—a study of traffic conditions, of freight conditions, of railroad practice. Should we be assured of the good faith of the railroad

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company, of its real desire to know the truth, and its willingness to deal with us; should it be proved that a change to motors will save time, money and friction and conduce to more efficient railroading, there can be no doubt of the propriety of careful investigation at almost any reasonable cost, keeping clearly in mind that the problem is first a railroad problem to be investigated by the railroad with our help and not a truck problem to be studied by us with the help of the railroad. The result may prove the wisdom of changing to motors, in which case the company making the study should secure the sale; or it may prove a change to be unwise, in which case we should be the first to admit it.

Similar cases may be suggested without limit. Probable advantages from the establishment of 'bus lines, or profits to be secured or increased by employing motors for general express service or local deliveries, are fair examples of legitimate prospects where investigation may be extended to great limits, always again keeping in mind that one studying another man's business, as to which he has only a limited experience and insufficient data, must make use of the wider knowledge and experience of the truckman or omnibus man himself.

In this rather hasty and superficial way I have attempted to point out what I believe to be the merits and limits of investigation of the service conditions under which our trucks, if sold, are to be operated.

Let me summarize it again:

Investigation to determine whether or not the truck, when sold, will be reasonably certain to do the work is justified and necessary.

Investigations such as should be made by a salesman under supervision by this department head are also entirely justifiable.

Investigation by a special department for that purpose should be made with great conservatism, and then only from the point of view of the customer; in other words, by assisting him to study his own problem and not by studying ourselves—a problem as to which our knowledge of facts must be superficial and our conclusions may be not only biased, but unsound.

In carrying out any policy regarding this important matter, let us always remember we are selling machinery. It is often said we are selling transportation, and by that, I take it, is meant that we are agreeing to furnish proper service to customers buying our trucks. We all of us know, I think, that this slogan has led to much misunderstanding on the part of our customers; much misleading by short-sighted salesmen who think only of their commission, and that it is a heavy tax upon our companies in free repair and guarantee allowances.

LIMITATION OF WEIGHT, SIZE AND SPEED OF MOTOR TRUCKS FOR PRESERVATION OF THE ROADS

By E. S. Foljambe, Managing Editor Commercial Car Journal and Chilton Publications

IN view of recent legislation or attempted legislation in various parts of the United States, the subject which your committee has handed me for discussion must be considered as important. The question is not,—are modern roads inadequate for modern traffic? but,—shall the size, weight and speed of trucks be regulated to conform to the roads which we have? Furthermore, shall this be done by a group of incompetent, inconsistent, imbecilic Councilmen, without interest or investigation, or shall it be done intelligently by a group of truck manufacturers, who have thoroughly investigated every phase of the situation?

A Middle Course Best

We all recognize that street paving and road making has been outstripped by commercial car advancement, but we must also recognize that there is a middle course, which will insure greater advancement to the industry 10 years hence, than an extreme policy which disregards the present limitations of the road makers and the desires of the lawmakers. We must meet them part way, and I believe that it is desirable at this time for the automobile manufacturers themselves to restrict, in an intelligent way, the weight and speed of motor trucks. It is far better that judicious, suitable, and non-hampering restrictions be placed on truck producers by themselves, than for the industry to suffer a setback from injudicious, unsuitable, and hampering regulations by city Councils or State Legislatures, that do not realize the blow they are dealing.

The subject naturally divides itself into three headings, weight, size, and speed.

The speed of trucks we do not have to discuss, as all agree that limitations on speed are absolutely essential, if the best and highest efficiency of truck service is to be attained. The question then simmers down to one of the limiting size and weight.

Total Weight *Versus* Weight Per Inch of Tire Width

There is an agreement that weights should be regulated, as far as road surfaces are concerned, by weights per inch of tire width, rather than total weight. The latter, however, must be taken into consideration on account of bridges, manholes, ferry approaches, and other present, and we may say, inadequate equipment. Certain recommendations were made at conferences on the subject at Paris and Brussels, 8000 lbs. being suggested as the maximum allowable rear axle weight, for a speed of 10 to 16 m.p.h. It will at once be noticed that the latitude suggested in speed is so great as to cover practically all vehicles from 1000 lbs. to 5 tons, so this suggestion means but little. In New York and Massachusetts, 9000 lbs. for a speed of 15 m.p.h. is suggested. In Pennsylvania the law is based on total weight of vehicle and loads as follows. Gross weight, 5000 lbs., 15 m.p.h.; gross weight, 10,000 lbs., 12 m.p.h.; gross weight, 15,000 lbs., 10 m.p.h.

We find that the average load on the rear axle of the six-ton American trucks is 14,121 lbs. It is at once apparent that this is far in excess of the suggested loads of the various conferences or of the restrictions of New York or Massachusetts, but the speed of a six-ton truck is less than 15 miles. Practically all of the manufacturers will agree that such loads are perfectly feasible, practical, and in fact are in common, daily use, and without excessive destruction to road surfaces. And why? Simply because tire width sufficient to distribute this load is provided. With an allowable 800 lbs. per inch of width, 18 in. is ample for this weight, or 9 in. of tire width to each rear wheel. With only 18 in. required, tire manufacturers supply either 36x6 dual, or 40x7 dual, or 24 to 28 in. of width. This is only slightly over 500 lbs. per inch of tire width. This shows that the manufacturers are already more than meeting the requirements of the lawmakers on load per inch of tire width.

The maximum total weight is, therefore, the bone of contention. This weight must now be determined by what the present bridges, culverts, manhole covers, and ferry approaches can stand, and the load should be distributed to conform to suitable loads per inch of tire width. But every effort must be made by the truck interests to bring the bridges and roads up to meet modern traffic requirements.

Small Trucks Increasing, Large Units Decreasing

That it does not pay to make excessively large vehicles is shown by the production of the manufacturers themselves. Our data shows, comparing the productions of 1912, 1913 and 1914, and estimated production of 1915, that there has been a notable dropping off in the number of large units produced, with a more than corresponding increase in the number of small cars.

If present regulation is considered desirable to forestall the lawmakers, the suggestion is made that the truck manufacturers through some such representative body as the N. A. C. C. provide as regular and standard models, vehicles up to 6 tons capacity, and only permit the manufacture of larger units for special work; in other words, the capacity of standard trucks be limited to 6 tons, except where special provision is made.

At this point the subject of trailers is naturally brought up, and here again the matter should to a certain extend take care of itself automatically, because these are separate vehicles and the load is distributed on extra wheels. Therefore, the limiting weight per inch of tire can easily be kept within bounds. The trailer, however, introduces the problem of length and total weight of vehicle.

Size of Trucks

In the first place, the size of a truck for what it will handle, compared with any other type of vehicle, is vastly to the advantage of the truck. Still we have examples of legislation, such as the proposed city ordinances for New York City, which are even now under discussion, which limits the length to 24 ft. 6 in., the height to 12 ft. 2 in., and the width to 7 ft. 6 in. Street congestion is usually the basis on which such legislation is proposed. Lawmakers evidently do not consider the fact that a single truck 24 ft. 6 in. in length is capable of handling as much as two horse trucks of the same length each. Instead of congestion, every truck, not only on account of its size, but on account of its mobility and greater speed, reduces congestion at least 60 per cent. There are now in operation in New York City most successfully motor driven vehicles which are in the neighborhood of 2 ft. longer than this proposed limit, each of which has displaced from the streets of New York City twelve to fourteen horses.

There is no reason why the length of a vehicle should be so curtailed, and the truck makers through their representative body must be prepared to kill such legislation.

To forestall adverse legislation and to substitute uniform regulations it seems advisable for the truck manufacturers themselves to take action just as soon as possible on these important items, and be in a position to present limiting specifications which will forestall the ambiguous, antagonistic, and even annihilating ordinances which are daily being proposed.

(*For other papers read at convention see page 33*)

The CCJ has most readers because it gives most information

Keeping the Cylinders Free of Carbon

By MURRAY FAHNESTOCK

CARBON deposits in the cylinders are about as inevitable as death and taxes, so their partial prevention and removal are therefore of interest to every user of motor trucks. Carbon deposits reduce the power of the motor, increase the amount of gasoline consumed, and often cause pre-ignition and knocking. This pre-ignition increases the wear of the motor, and is caused by carbon particles which become incandescent and fire the charge before the piston has reached the top of its stroke.

Prevention Better Than Cure

The old adage, "An ounce of prevention," can be well applied to the prevention of carbon deposits in the cylinders. The proper method to clean the carbon out of the cylinders is to prevent its formation. It is fortunately true that the most approved methods used to prevent the formation of carbon also contribute to the smoothness of running and the economy of the motor in other ways, thus furnishing a double reason for their use.

Three Causes of Carbon Deposits

The chief causes of carbon deposits are road dust, oil and gasoline. These will be considered in the order named.

Dust.—Small particles of road dust, entering through the air intake of the carbureter and passing into the cylinders, become cemented together by the gummed oil. Chemical analysis has shown that dust sometimes forms more than half of the so-called carbon deposit in the cylinders. This dust also hastens the wear of the pistons and other moving parts. The entrance of dust may be partly prevented by the addition of a fine gauze screen over the air intake of the carburetor. But, unless the screen has considerable area, it has a tendency to reduce the volume of the air admitted to the cylinders, consequently reducing the power of the motor. Some provision for cleaning the gauze occasionally should be made.

Oils.—Oils that do not contain carbon are also devoid of lubricating qualities. So the amount of oil used should be kept as small as consistent with adequate lubrication. A single drop of oil will form a film over a surface of two square inches; the function of the oil being to reduce friction by preventing the actual mechanical contact between two sliding or rotating surfaces. A well lubricated shaft, rotating in a properly fitted bearing, practically floats on a film of oil; and, if this film is constantly maintained, nothing but the oil will wear out.

Crude oil in its natural form is a dark, thick liquid from which lubricating oil is obtained by distillation and filtration. Repeated filtration removes most of the foreign elements which give the oil its dark color.

It is better to buy oil in sealed packages and of good make, for less good oil is required and so less carbon is formed than when oil of a poorer quality is used.

Rounding the Top Edge of Piston

A sharp edge on the top of the piston sometimes scrapes the oil from the sides of the cylinder and carries it up into the combustion space, where it burns and forms carbon. This may be remedied by rounding off the top edge of the piston. The upper edges of the piston rings may also be rounded off. If splash lubrication is employed, it may be advisable to fit baffle plates to limit the amount of oil that is splashed into the cylinders.

Gasoline.—Gasoline is a hydrocarbon and deposits carbon when not properly burned. The black smoke of the exhaust, when the mixture is over-rich, is a visual indication of this fact. For this reason, it is better to adjust the carburetor for economy, rather than for maximum power, as the motor will run cooler and less gasoline will be consumed. Also, much less carbon will be deposited in the cylinders. Some carburetors, especially those made several years ago, when properly adjusted for low speed, supply a mixture that is too rich at high speed. In such cases, some form of auxiliary air valve may be of value. This may be a simple petcock screwed into the intake manifold and controlled from the dash, or one of the patented devices now on the market. Whether the addition of a petcock is advisable may be ascertained by adjusting the carburetor for low speed and then, while traveling along a level road with the throttle wide open, increasing the amount of air by opening the air valve. If this causes increased speed, it may be assumed that the mixture had previously been too rich, and that the addition of a petcock to the intake manifold would be beneficial.

Gasoline entering the cylinders as a spray is more liable to coke and form carbon than gasoline that has been properly vaporized. For this reason, heating the air, and thus securing a more homogenous mixture, is of material assistance in preventing the formation of carbon deposits. The vaporization of gasoline requires heat, just as water requires heat to change it into steam.

While the above methods will reduce, they cannot altogether eliminate the necessity of removing the carbon from the cylinders.

Chemical and Mechanical Methods of Removing Carbon

There are two general methods of removing carbon from the cylinders. These methods include: liquids for loosening up the carbon, so that it will be blown out through the exhaust; the use of kerosene; of water; of salt, and of oxygen. There are many special carbon removers on the market, some of which are claimed to dissolve it.

Chemical Methods.—Carbon is not soluble in any available chemical compound. The appearance of the exhaust, after the use of carbon removers, proves this. But the so-called carbon in the cylinders is, in reality, road dust and carbon particles, cemented together by gummed oil. If this burnt oil is dissolved, the carbon deposit will be loosened up and blown out through the exhaust, and this is what takes place. Acetone and other liquids are often used for this purpose, but care should be taken not to use any liquids having a corrosive action on the cylinder walls.

Kerosene is very generally used, the best results being obtained when the kerosene is allowed to remain in the cylinders overnight, this giving it a chance to penetrate the carbon deposit. While the kerosene may dissolve the gummed oil to a certain extent, its action is largely mechanical. When the motor is running, the heat vaporizes the kerosene, which expands and forces the carbon particles apart, thus enabling it to be blown out through the exhaust. Kerosene leaves the cylinder walls somewhat greasy, but the motor should not be run too fast, until the normal lubrication of the cylinders has been resumed. If more than a teaspoonful of kerosene has been placed in each cylinder, the oil should be drained out of the crank case and replaced by a fresh supply.

In steel mills, it is customary to sprinkle salt on the red-hot plates to remove the scale, which is then blown off by the violence of the chemical reactions which ensue. In the same manner, a motor may be cleaned by running the motor with a retarded spark, until it is very hot, and then pouring in fine salt through the spark plug hole. Then the motor should be run until it is again very hot.

Burning Out the Carbon

The use of oxygen for burning out the carbon is a good method, which may be used at a garage equipped with an oxygen tank or the oxygen may be made at home by the use of an oxygen generator.

Mechanical Methods

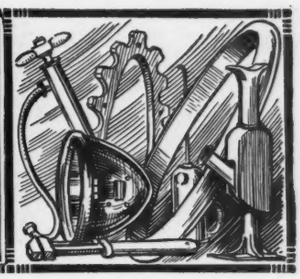
Removing the cylinder heads and scraping out the carbon is one of the most certain, if not the easiest, methods of carbon removal. But it is necessary to remove the cylinders, if the space behind the piston rings is to be cleaned.

It is often possible to clean the cylinders, without removing them, by using steel scrapers. If these scrapers are of the rigid type, it will be necessary to use several different shapes in order to reach all parts of the cylinders. But effective scrapers may be made of clock springs. Pieces about 10 in. long should be ground to chisel edges at the ends. The natural curve of the springs will force the edge against the top of the piston, or against the top of the cylinder, according to whether the spring is turned up or down. Other scrapers should be bent at right-angles, a short distance from the ends, in order to reach difficult corners.

A steel ball, ¼ in. in diameter, is sometimes placed in the combustion chamber, and is supposed to knock the carbon loose as it bounces around while the motor is running. But it may damage the spark plug; and the cylinder should also be examined to see if there are any ledges or projections against which the steel ball might be forced by the piston as it approaches the top or the possibility of the ball lodging over one of the valves and preventing its opening. The ball should not be left in the cylinder, as it would eventually break and the pieces might score the cylinder wall. Special chains are also on the market for this purpose.

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

TRUCK ACCESSORIES AND APPLIANCES



NEW WARNER TRANSMISSION FOR LIGHT-WEIGHT TRUCKS

One of the later transmissions brought out by the Warner Gear Company, of Muncie, Indiana, is its model T38A, for use in trucks of from 1500 lbs. to 1 ton capacity.

The transmission is of the sliding gear "unit with motor" type, and was brought out to meet the rapidly increasing demand by the trade for a strong efficient three-speed transmission, satisfactory for use on worm drive or internal gear drive commercial cars. With this end in view, the speed ratios and bearing capacities have been most carefully worked out and the entire design perfectly balanced for this class of service.

The gear case is either of cast iron or aluminum, as preferred. The gears are 6-8 pitch, 3½ per cent. nickel steel, carefully heat-treated. The shafts are of 3½ per cent. nickel steel, hardened and ground, the countershaft mounting upon Hyatt bearings and the main shaft and main drive gear upon annular bearings. A double row bearing takes all radial and axial loads at the rear of the main shaft. The main shaft is of the four key spline design with a ground finish which holds to close limits, and insures the gears of an easy sliding fit, at the same time holding them perfectly and squarely in mesh.

A selection from three different designs of clutch is allowed on this transmission, each clutch being oiled from the gear box through an oil lead drilled central in the main drive gear. The multiple disc type of clutch carries extra large diameter discs, which give an exceptionally strong pulling clutch, but, at the same time, very flexible action. The cone clutch is designed with pressed steel leather faced cone, using spring inserts under the leather to allow gradual engagement and prevent any grabbing action. The three-plate toggle design is an old principle with a new adaption, and allows the use of a lighter clutch spring.

This makes a very easily operated clutch. Pressure from clutch spring passes through three toggle joints and against the plates, thus compressing the two outside members against the Raybestos faced central plate with pressure almost infinite. The strength of such a clutch is practically limitless as adjustment for taking up the wear is allowed at each joint and the spring pressure also may be increased.

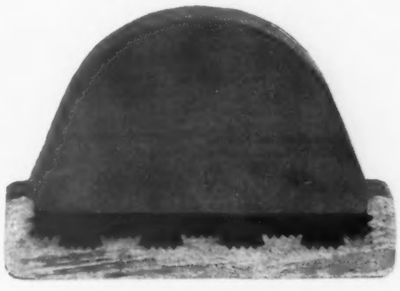
The casting carrying the shifting mechanism forms the cover of the case, as well as the control bracket. This greatly simplifies construction, and allows a neat and direct acting ball and socket type of control to mount directly over the gears for several inches to the rear as the chassis design demands.

New Warner Transmission and Clutch Unit

Suitable for commercial cars of from fifteen hundred pounds to one ton capacity. Transmission of sliding type, three speeds. Option on three styles of clutch is given.

McGRAW CHANNEL-BASE TIRE

The McGraw Tire and Rubber Company, of East Palestine, Ohio, is offering the truck user a tire of exceptional merit, known as the E. C. McGraw channel base tire. Two



McGraw Channel-Base Tire

of the most notable features of this tire are that it contains 20 per cent. more rubber than the Standard S. A. E. tire, and it carries a guarantee of 10,000 miles.

The tread is made of a light compound, treated by a special process to give it sufficient toughness to withstand sever strains.

NEW LIGHT-WEIGHT WOODWORTH TIRE PROTECTOR

Many advantages are claimed for the new Woodworth Light-Weight Tread which has just been placed on the market.

The Light-Weight Woodworth Tread is made from leather prepared by a new process, especially for tire protectors which shows in tests for abrasive wear, nearly double the durability of chrome tanned cow and steer hides. The protector is held on the tire by coil springs 3 in. long, placed about a foot apart along each side and connected by strong, inelastic fabric strips. These are fastened to the leather in such a way that they hug very closely against the sides of the tire. These springs automatically

Latest Woodworth Tire Protector

adjust the treads, keeping them always perfectly tight, so that there is no danger of the tire being chafed and consequently overheated.

The tread is made of one ply of leather throughout its width, and is studded with from three to six rows of steel-studs on the middle portion according to size.

The leather is practically puncture-proof and is permanently waterproofed by the Woodworth process, so that it always remains flexible, and as the treads are very light, they have no noticeable effect on the power or easy riding qualities of the car.

The light-weight treads list at $6.90 each for the 30x3½; $9.70 each for the 34x4, and at proportionately low prices for the other sizes. Made by the Leather Tire Goods Company, Niagara Falls, N. Y.

THE "POWERSTEEL TRUCKLINE"

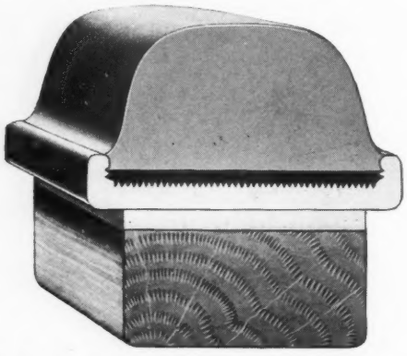
The Broderick & Bascom Rope Company, 805-09 N. Main Street, St. Louis, Mo., offers a towing line made of flexible wire rope, which will withstand a breaking strain of 12 tons. It is 18 ft. long, ½ in. in diameter. To the ends of the rope are attached strong drop forged hooks, and heavy manila or wire rope slings, as desired, are furnished for instant attaching. Prices—with manila slings, $6.50; with wire rope slings, $6.75.

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

NEW KELLY-SPRINGFIELD SOLID TIRES IN DEMOUNTABLE, PRESSED-ON AND SECTIONAL-BLOCK TYPES

An announcement of unusual interest to commercial car users, is that the Kelly-Springfield Tire Company, 229 W. 57th Street, New York City, is offering a complete line of solid tires, in single and dual types, for motor trucks.

In the demountable type the channel has a protecting flange or shoulder which guards the rubber base from abrasion, chipping or breaking away from the metal rim, when coming into contact with the curb or other projections. In addition to this, there is another shoulder to the side flange which affords an added safeguard. The channel and inner faces of the shoulders are provided with serrations, into which is first worked a hard rubber compound forming a base; to this firm foundation is joined the

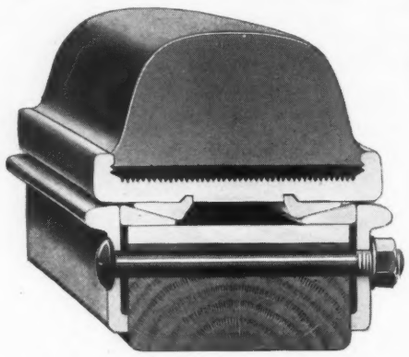


Section of Kelly-Springfield Pressed-On Solid Tire

well-known Kelly, durable, resilient tread, and the whole—metal rim and all—cured together. Thus the channel, hard rubber and tread are converted into one homogeneous, inseparable tire. This tire is easily removed; all that is necessary is to unscrew the nuts, take off the side flange and wedge rings, when the tire slides easily off the wheel.

Kelly-Springfield Single Sectional-Block Tire

The pressed-on type is built up exactly like the demountable type, but the method of mounting on the wheel is different. By means of a press, the tire is forced directly over the S. A. E. wheel band, thereby eliminating the unnecessary weight and expense of an intermediary band, a simple operation requiring but a few moments to accomplish and occasioning the least delay, 20 minutes often being all the time that is necessary. The advantages of this type are the absence of separate parts, less



Section of Kelly-Springfield Single Demountable Tire

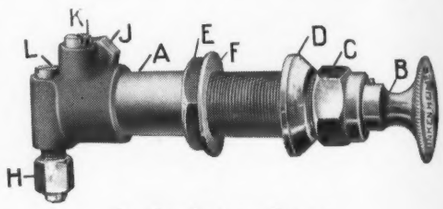
expense, weight and trouble. As the tire is applied to the wheel under a pressure of many tons, it attains a degree of rigidity which will resist any road strain, no matter how severe. By employing the same pressure, however, the old tire may be instantly removed.

The block tires have unusual traction power and non-skid protection. The space between the blocks allows for expansion, thus preventing "kneading" and heating and giving in effect an "air-cooled" tire. There is an unusual depth of cushion, giving easier riding and reducing the jolts on the chassis.

THE LUNKENHEIMER PRIMER

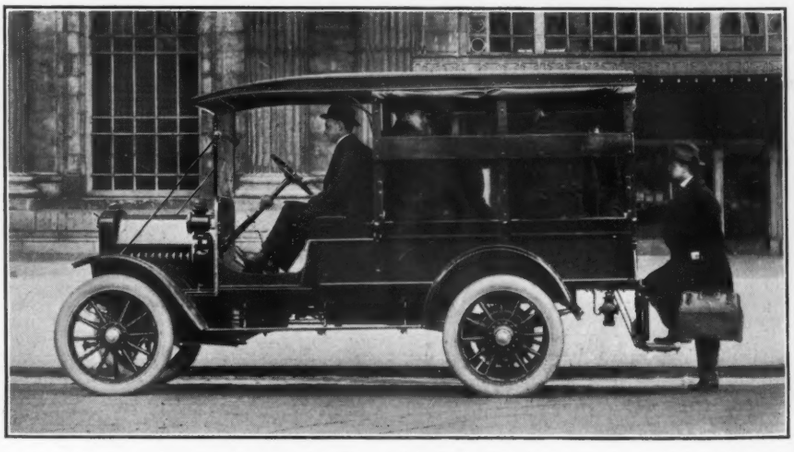
The purpose of this device is to provide quick, convenient and simultaneous priming of all cylinders of multiple cylinder engines. It is very easy to attach, and occupies but little space, the cylinder measuring only 5/8 in. in diameter and 2 7-16 in. in length. Although small in size, it is exceptionally efficient and the positive priming of all cylinders can be accomplished with practically no trouble or loss of time. If properly placed, the driver need not leave his seat to prime the engine.

Another feature claimed for this primer is that it acts in the nature of a safety device, inasmuch as when priming, gasoline is not exposed to the atmosphere. Lukenheimer high grade, bronze composition is used, none of the parts being made of materials that will deteriorate under the chemical action of gasoline. The Lukenheimer Company, Cincinnati, Ohio, is the manufacturer.



Lunkenheimer Primer
Primes all the cylinders simultaneously

Commerce Combination 'Bus
With seats raised as when used for baggage trips. The capacity is fifteen hundred pounds. Made by Commerce Motor Car Company, Detroit, Mich.



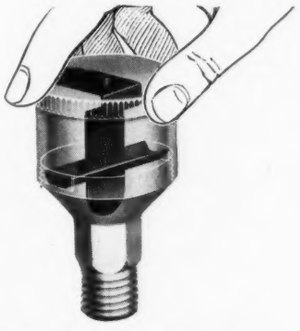
Commerce Combination 'Bus
Showing it used as a passenger-carrying vehicle for hotel service or jitney 'bus. Made by Commerce Motor Car Company, Detroit, Mich.

The CCJ leads in circulation, advertising and prestige

"KLICKET" RATCHET GREASE CUP

The American Stamping Company, of Battle Creek, Mich., is just announcing a new grease cup, which should appeal to the truck maker. The principal feature of it lies in the application of a ratchet device which eliminates lost covers and which emits a clicking sound every time the cover is turned a quarter of a revolution. Thus, by noting the number of "clicks," one can tell how much grease is being squeezed out.

The simple, durable, ratchet device is placed within the cup itself and there is nothing outside. The ratchet locks the cap on the cup and effectually prevents its working up or down. It can be turned down as easily and accurately in the dark as in the daylight. It is made in all sizes,



"Klicket" Ratchet Grease Cup

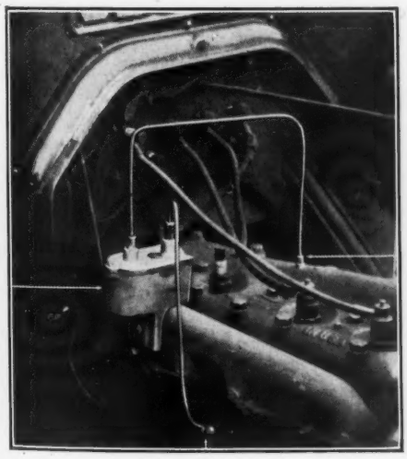
The ratchet eliminates lost covers. By noting the number of clicks, one can tell exactly how much grease is being forced out.

and comes in steel, dull brass, bright brass and nickel plated brass. Prices are $.15 and upward.

THE ECONOMY VAPORIZER

This device is clamped on the exhaust manifold, having tubing to the cooling system and to the intake manifold. It takes water from the cooling system, converts it to steam, and delivers it, as a vapor, into the intake manifold. This moisture in the mixture is claimed to give fuel economy, better running, decreased carbon deposit, removal of the deposit already in the cylinders and clean plugs. The amount of water used varies with the sizes of the engine, a Ford using 1 pt. in 25 miles.

This economizer is marketed by the Economy Auto Specialty Company, 1063 McCormick Building, Chicago, Ill. For Fords, the price is $5; four-cylinder engines up to 4 in. bore, $5.75; fours from 4 to 4½ in., and sixes up to 3¼ in. bore, $6.75; fours of 4½ in. bore and over and sixes of 3¼ in. bore and over, $8. These prices include all connections.



Economy Vaporizer Installed

Takes water from cooling system, converts it to steam and injects it in the form of vapor into intake manifold.

THE K-C SAFETY LOCK BLOW-OUT PATCH

The K C Safety Lock Patch is designed as a permanent repair for any small blow out in a tire. It has loops which are integrally formed with the fabric. These

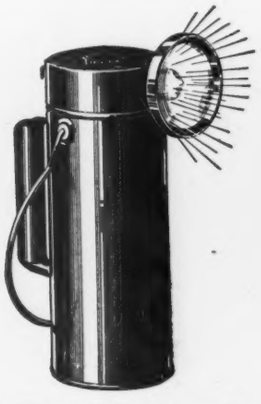
K-C Safety Lock Blow-Out Patch

Loops, locked by wire key, support a break or cut in the casing.

loops dove-tail, and are locked with a wire key. In this way the patch does not depend on the broken or injured tire for support. This patch does not press up against the hole in the case, it holds its own pressure. The interlocking loops extend within 2 in. of either end. This allows the patch to swell on either end so that it cannot creep. It is all ready to be put on in a minute, and can be used over again. It is marketed by the Western Tire & Rubber Company, Kansas City, Mo.

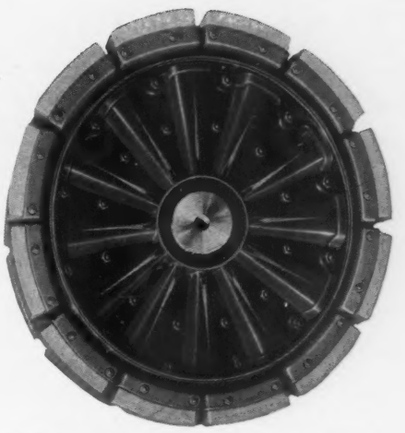
NOVEL TYPE OF AUTO WHEEL

A wheel for motor trucks, stamped from a single disc of steel, is being manufactured by the Pressed Steel Wheel Company, 1004 South Hall Street, Los Angeles, Cal. The advantages claimed for this type of wheel are cheapness and simplicity of manufacture.



Delta Electric Hand Lamp No. 7

This lamp is recommended to truck operators, for trouble purposes; also for reading street numbers and signs, from the seat. It is fitted with a powerful reflector and operates on a single dry cell. It is made by the Delta Electric Company, Marion, Ind., and lists at $1.50.



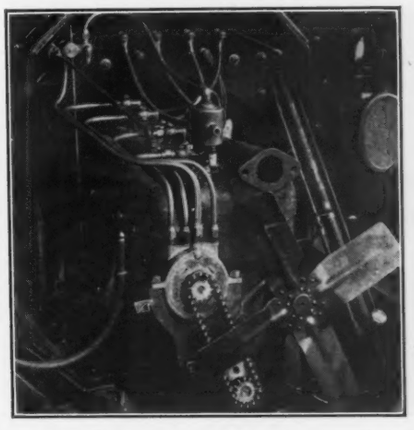
Truck Wheel Pressed from a Single Disc of Steel

The wheel is so devised that it withstands side strains and is apparently indestructible under most severe usage. Being stamped from a single disc of thin steel, it is, therefore, very light and is claimed to be exceptionally durable.

THE G & M AUTO STARTER

This is an air starter, having few parts, weighs but 25 lbs., with air tank, and sells at $37.50. It is the product of the Goodwin and Miles Company, 241 Sansome Street, San Francisco, Cal.

The air pressure is taken from one of the engine cylinders by a water-cooled check valve, this, however, not appreciably decreasing the power of this cylinder, the manufacturer says. This pressure is retained in a tank, from which a dash valve delivers it to a distributer, which is driven from an exposed moving part of the engine. This distributer has an action very similar to an ignition timer, being "timed" to the engine and distributing the air to the cylinders at about the same time the spark regularly occurs, thus driving the piston down and starting the engine.



Installation of G & M Starter

Air is taken by a check valve from one engine cylinder, stored in tank, and distributed to engine in proper cylinder sequence.

The CCJ has most advertisers because it gives them biggest returns

HILLIARD TYPE "B" MULTIPLE-DISC CLUTCH

This clutch is primarily designed for trucks using engines ranging from 40 to 60 h.p. Its constructional feature is that an enormous pressure is obtained with a slight, gradual movement directly against the center of the friction pack, which allows the motor to pick up its load gradually and without any jerk. The clutch consists of three units—the housing, the friction pack, and the engaging mechanism. The illustration shows the cover removed. In back of the plate A are the friction plates. The method of setting up the friction is by a cam and gear mechanism, operated by racks B integral with a sleeve C, which is engaged and disengaged by means of a spring. As the spring moves the sleeve C toward the friction pack, the sleeve turns the gear D, which operates on a cam against a stationary nub, forcing the part E against the plate A. The spring pressure is thereby transferred from the spring to the center of the friction pack. To simplify the explanation, one might say that when turning the handle of a vise the action of its jaws would be similar as in the set-up and release of this clutch. During the operation of moving the sleeve, or in other words, letting in the clutch; the advantage of a compound lever and wedge action is brought into play, which multiplies the initial pressure seven times, so that if a 200-lb. spring were used, a pressure of 1400 lbs. would be exerted. Should the sleeve move 5/8 of an inch in travel, the cam gear would move 3-32nds, which is seven times slower. Therefore, an enormous pressure can be obtained with a slight, gradual movement against the friction pack. This clutch is made by the Hilliard Clutch & Machinery Company, 104 W. 4th Street, Elmira, N. Y.

The Hilliard Clutch—Cover Removed
For explanation of letters of reference, see text

"MAYARI" ALLOY STEEL FOR TRUCK PARTS

The Pennsylvania Steel Company, with offices in Morris Building, 1421 Chestnut Street, Philadelphia, calls attention to its "Mayari" brand of steel, which is a natural alloy steel, which when heat-treated, is claimed to be equal or superior to 3½ % nickel steel. The makers say that this steel is meeting with unusual success in the manufacture of crankshafts, transmission, drive and jackshafts, I-beam, tubular and driving-axles, connecting rods, transmission and differential gears, case hardened, water- or oil-hardened frames, high-tensioned bolts, steering knuckles and springs. The company is also offering Silico-manganese spring steel, concave flats and standard rounds. This grade of steel shows a tensile strength of 210,000 lbs., elastic limit 190,000 lbs, elongation in 2 in. 10.0 per cent., reduction of area 30.0 per cent. and is tough, resilient and fibrous.

ILLINOIS VALVE REMOVER

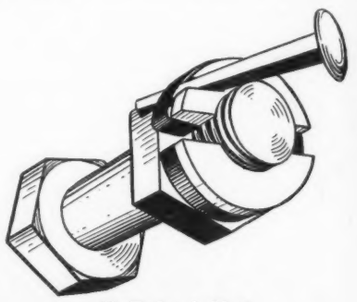
For removing valves from engines, H. G. Paro, Michigan Boulevard Building, Chicago, Ill., is marketing the remover shown herewith. The feature is the adjustable jaws, which permit the use of the tool on various size valves and on valves located in "hard-to-get-at" places. The tool can be used with one hand, and will retain the spring until the valve is returned to the engine. Price, $1.

Illinois Valve Remover Holding Spring

The Winkley Dust-Proof Spring Shackle Bolt
The Winkley Company, Detroit, Mich., offers a new shackle bolt, which is fitted with a dust-proof lock cap. Can be had in all sizes

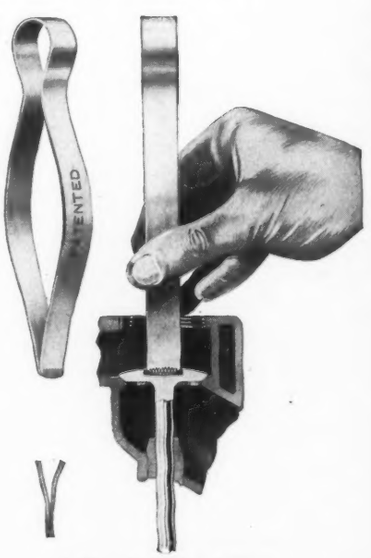
THE F. F. LOCK NUT

This nut can be locked on the bolt at any point. It is the product of F. S. Fluke, 1408 E. 54th Street, Chicago, Ill. When the nut is drawn to the proper adjustment, a tap on the nut causes the spring, which lies in a groove of the nut, to engage the bolt, making the nut immovable. To release the nut, a nail or sharp-pointed tool is inserted in the release slot, drawing the spring away from the bolt, leaving the nut free.



F. F. Lock Nut
Showing the spring engaging the bolt, preventing movement of the nut. When a sharp-pointed tool is driven into the release slot, it draws the spring away from the bolt, leaving the nut loose.

"Standard" Steel Tool Box for Ford Delivery Cars
Showing one of the many styles of tool boxes made by the Standard Steel Box Company, Bridgeville, Pa. Measures 22 x 9 in. x 6¾ in.



A Handy Valve Lifter
The Fulton Company, of Milwaukee, Wis., is offering this novelty, which is constructed of one piece of spring steel. Pressing the spring together forces the ends apart. These ends have a double knurling on the outside, which engages securely the side of the valve slot. Price, 75 cents

Twelve Principles of Efficiency Applied to Trucks

Some Common-Sense Advice Dedicated to Those Who Have to Do With the Ownership and Care of Commercial Cars

By MURRAY FAHNESTOCK

HAPHAZARD truck operation may save money over the cost of horse haulage—it may even be profitable, because of the innate efficiency of the trucks—but it cannot prove its true value unless the true principles of truck efficiency are known and applied. In a comparatively new method of transportation, such as motor trucks, the application of efficiency principles is even more important than in older methods in which the fruits of long experience and costly mistakes have been formulated in certain accepted methods of procedure.

I. Ideals

CLEAR and definite ideals are a prerequisite to clear thinking and rational action. An army cannot act coherently or achieve victories without ideals, and a fleet of motor trucks may be regarded as a unit for the capture of a certain definite trade or for delivering the greatest number of ton-miles at the smallest expenditure of time and money. It is foolish to start on a journey without a knowledge of one's destination, and it is equally foolish to attempt motor truck operation without having clear and definite ideals as to the results to be achieved. Shall the ideal be to save time in delivery, as in the case of stores having impatient customers, or of contractors who wish to deliver asphalt while it is still hot from the factory to the streets to be paved? Or is the ideal to be the most economical delivery per unit? Whatever the ideals may be, they should be definitely known.

II. Common Sense

IT IS common sense to use small, light trucks for delivering a large number of light units, unless they are all to be delivered to certain distributing centers. The stopping and starting of a truck costs money, and it costs more in the case of a large truck than in a smaller one. It is common sense not to keep a water-cooled truck in an air-cooled garage, where the water may freeze overnight if a tired driver should forget to drain the water. It is not well to put too much confidence in human judgment. It is more sensible to use an anti-freezing solution. It is common sense not to let the truck run without inspection or repairs until something breaks, for the loosening of a bolt may cause damage to other parts of far greater value; or the break may occur at an inconvenient time or place.

III. Competent Counsel

COMPETENT counsel can be secured from many sources—sometimes it must be paid for. In the form of experience, it is apt to be costly. The sales and service departments of the motor truck makers are often capable of furnishing competent counsel, but its disinterestedness depends largely on their honesty and the kinds of trucks they make. The counsel of purchasing engineers is sometimes advisable in the case of those who have not had much experience in the motor truck line.

The trade journals, which act as clearing houses of motor truck ideas, can often furnish the latest advice on motor truck installations, but the magazines can hardly be expected to conduct investigations and give detailed reports on local conditions. The trade journals enable one truck owner to profit by the experience of another, and a study of the trade journals should be an important part of systematic truck operation. The industry is still so young that reliable books are lacking.

IV. Discipline

DISCIPLINE should exist only that ideals may be attained and there should be as little arbitrary discipline as possible. Over-speeding and over-loading the truck will increase the cost of maintenance and the reasons for the enforcement of these rules should be easy to explain to the driver. The drivers of the trucks of one department store are dismissed if a pair of pliers is found in their possession, for they are not allowed to attempt any repairs; but the driver of the solitary truck is generally expected to make all his own repairs and to call for help only in the case of a total breakdown.

V. The Fair Deal

THE fair deal should be applied to both trucks and drivers. The care and intelligence applied to the care of horses will return even larger dividends if applied to trucks. It is hardly fair to expect a hard working truck to maintain its efficiency on poor grades of lubricating oils and gasoline. If an army travels on its "stomach," then a truck travels on its "lubrication." Regular hours for the truck driver will improve the quality of his work. Driving a truck involves a certain amount of nervous strain and an overworked driver is not apt to guide the truck as carefully as one who is worked at a normal rate. The driver is not responsible for the vagaries of the weather and the driver who is always on time irrespective of conditions, is not always the most economical when the repair bills come in. To give the driver credit for good service is equally as important as blaming him for failure to maintain schedules.

VI. Records

RECORDS should be reliable, immediate, and accurate or their value is largely lost. This does not mean that they should be complicated or require much of the driver's time; for truck drivers, as a rule, do not take kindly to clerical work. A record that is not reliable is worse than useless, and if records are not immediate, they lose much of their value. Most people are far more reckless about contagious diseases than they are about being burnt or cut, because a cut or burn sends in a painful sensation that is reliable and immediate; while the ravages of a disease are not felt for weeks after the infection. If the gasoline record shows that an undue amount of gasoline is being used, a leaky tank may be suspected; but of what use is such a record, if it is not compiled for six months after the first loss of gasoline occurs? Then, too, the effect on the driver of what he did yesterday is much more than a record of what he did last month. Mileage records should also be kept as they show unnecessary distances covered and tend to prevent joy-rides. Although there is not much inducement to use a heavy truck for joy-rides, the lighter pneumatic tired vehicles are in a different class. Records form the basis of future improvements as well as being a history of past mistakes.

VII. Planning and Dispatching

THE draftsman works for days over the drawing board before the first steel beam is cut to size in the shops. It is much easier to erase a line drawn on a sheet of paper than it is to rectify an error made in a five-foot plate girder. In the same way, it is easier and better, by the aid of city and county road maps, to give the driver his exact route for the day's work, than to allow him to choose his own route, in the hope that he will accidentally find the best way. The driver who goes a mile or two out of his way, will generally overspeed on the next ten miles to make up his lost time and keep his record clean rather than admit his mistake, and be called for it.

It is better to despatch the trucks early, when the streets are comparatively free from traffic, than to start them later and have the trucks still in operation or returning home after dark, when the streets are filled with tired workers and there is more strain on the drivers and danger of accidents.

Despatching also arranges that packages near home be delivered first rather than carry them over the entire route. It is packages deliveed that counts rather than ton-miles.

VIII. Standards and Schedules

HOW can the proper operation of trucks be ascertained, until standards and schedules have been established? The standards of horse-drawn traffic are entirely too slow for motor trucks and the suitable speed for light motor trucks is entirely too fast for the trucks of greater capacity. Then, too, the character of the driver should be considered; for the steady driver, who may be able to obtain the best results from a five-ton truck, may drive entirely too slowly to get the maximum efficiency from a lighter vehicle. The driver must be chosen to suit the truck, if the best results are to be secured. The

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

standards may be of unit parcels delivered, or of costs per ton mile, but they should be of some form that permits judging the success or the failure of the day's work. The standards should not be set so high that the truck is forced to travel at its maximum speed at all times for the most economical speed for truck operation; safety, economy, and reliability being considered, is generally somewhat lower than the speed at which the truck can be forced to operate by hard driving. It is not mere strenuousness that is required—it is intelligent effort. Men and machines have their natural limits; to exceed them kills the goose that lays the golden eggs.

IX. Standardized Conditions

IF it takes 30 minutes in the morning to fill the gasoline tank with a can and funnel; haste on the part of the driver is more apt to result in wasted gasoline than in any material saving of time. But the use of a tank in which the gasoline is stored under pressure, and fed directly through a hose into the tank of the truck, may reduce the time required for filling to 2 or 3 minutes. Saving the time of the driver is equivalent to saving the time of the truck. There are 600 minutes in a working day, and, at an average value of plant and equipment of $18 a day, the value of a single minute may be expressed at 3 cents. And a saving of 15 minutes a day will result in a saving of $150 a year for each truck.

When the maximum speed under one set of conditions has been attained, it is a waste of effort to try to attain a slightly greater speed under the same conditions, when far better results can be obtained by changing the conditions. When man could not run any faster, he invented the bicycle and, by changing the conditions, doubled his speed. After he had attained the maximum speed on the bicycle, he changed the conditions by inventing the motorcycle, which doubled the speed with less effort. Many animals are far superior to man in physical strength, it is in thought that man is superior.

If the time of loading is unduly long, the use of chutes from the second floor, or of detachable bodies will keep the truck on the go. When the truck is carrying a load, it is earning money; when it is standing still, it is costing money. It is the difference between profit and loss.

X. Standardized Operations

AFTER speeds have been standardized, governors can be fitted to the trucks to keep the drivers from exceeding the standards. Standard times for loading and unloading involve teaching the drivers the easiest and most efficient methods of placing and handling the loads. It involves standardized driving and gear shifting, and the lubrication of the truck at certain standardized intervals. Without haste and without waste, but a time and a method for doing everything.

XI. Written Standard Practice Instructions

THE company pays for experience, sometimes in the form of wear and tear on the trucks, sometimes as higher wages for experienced drivers.

If the company pays for the experience of the driver, the company suffers an actual loss when the employee departs and takes his experience with him. It is sometimes possible, but not always profitable, to keep the driver's experience by keeping the driver. If the experiences of the drivers are written down, they form a part of the assets of the company, more tangible than good-will and other frequently capitalized values. The written instructions of the correspondence schools are an excellent example of the manner in which experience can be imparted to others through the medium of written standard practice instructions.

The correspondence course for truck drivers published by the Commercial Car Journal is available to motor truck owners. These instructions are the result of the experience of many drivers under a wide variety of conditions. They can be supplemented by written instructions covering the operating conditions of the trucks belonging to the individual owner.

XII. Efficiency Reward

HUNGER and love offer efficiency rewards that compel the greater part of mankind to work. History tells us that few men will work, after the habit has worn off, when these efficiency rewards have been removed. Most men will work hard enough to hold a position, but not much more, unless some form of extra pay for extra work is offered. This may be dependent upon work accomplished, the condition of the truck, or on a combination of these factors. A picture can be painted in one color, or in two or three, but it will not be a complete picture unless all the necessary colors are used. Trucks can be successfully operated on one or more of these efficiency principles, but to achieve the highest results, they should all be known and applied.

WHAT ONE LUMBER FIRM ACCOMPLISHED WITH TWO TRUCKS

During the past 6 years Montgomery Brother and Company, Buffalo, N. Y., retail, wholesale and manufacturing lumber dealers, have operated two six-ton Mogul trucks in conjunction with fourteen teams of horse-drawn vehicles with a great deal of success and saving.

"Our business has increased," said Mr. G. H. H. Hills, treasurer of this firm, "since we have adopted the trucks for long hauls and left the short haul deliveries to the teams. We have been able to give our customers better and quicker service, also we have decreased our cost of teaming $3000 per year by adopting the trucks for long hauls."

In order to save time and avoid keeping the trucks from lying idle while a load is made up, the lumber is loaded on yard wagon provided with rollers, and the load rolled onto the truck by hand cranks. The trucks are also fitted with rollers so the load can be rolled off and the truck driven from under.

These trucks average daily 80 miles. Each truck making an average of eight trips a day with an average of 10 miles per round trip. The trucks usually carry about 4000 ft. of lumber per trip, against the horse-drawn vehicle which could only carry 1500 ft. of lumber. The horse-drawn vehicle could only make about two trips a day of 10 miles per round trip. In brief, each truck is able to deliver 32,000 ft. of lumber at a cost of $12 a day with eighty as the total mileage, against 3000 ft. as delivered by horses at a cost of nearly $8 per day, covering 20 miles.

It is costing this firm only $.375 per 1000 ft. delivered by trucks, against $2.66 per 1000 ft. Also, it is costing them only $.15 per mile to deliver by motor trucks, against a cost of $.40 per mile by horse-driven vehicles.

Ware Motor Vehicle Company, 771 Raymond Avenue, St. Paul, Minn., has received an order for thirty four-wheel drive trucks.

Troy Wagon Works, Troy, Ohio, has secured $500,000 worth of orders for truck trailers to be used by the warring nations of Europe.

Loading and Unloading Lumber

Lumber truck in use by Montgomery Brothers & Company. The view to the left shows how the load of lumber is transferred from the yard wagon (which has been previously loaded by hand) to the truck. Note that each roller of both truck and yard wagon, is provided with a squared end on which fits the crank for moving the load. The right view shows how a load of lumber is unloaded. The load is rolled out by means of the crank until it overbalances, then the truck pulls out from under it.

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

The Nevada Four-Wheel Drive Truck

THE Nevada Truck and Tractor Company, Nevada, Ia., is now offering a three-ton, four-wheel drive truck, designated as Model C.

The leading feature of the Nevada four-wheel drive truck is the feature of driving all four wheels instead of the two rear wheels only. The construction of the entire vehicle, outside of this one feature is very similar to conventional truck construction.

Engine

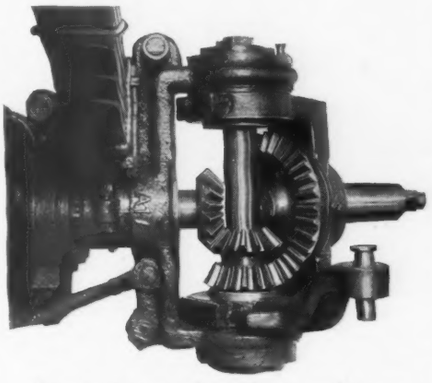
The engine is of four-cylinder type, water-cooled and four-point suspended. It is a special heavy duty member, slow speed with automatic governor, bore 4½ in., stroke 6¾ in., L-head cylinders, cast in pairs, 32.4 h.p. by S. A. E rating. Lubrication is by a self-contained automatic system, circulating the oil constantly by a gear-driven pump. Ignition is by Bosch dual system, using both magneto and batteries. Cooling is by water, with horizontal tubular radiator, coil spring suspended. Water is circulated by a gear-driven centrifugal pump on the forward end of engine. A belt-driven aluminum fan is supported back of the radiator.

The governor is of the vertical, loose-ball type, direct connected with the intake manifold. The engine control is by throttle only, lever being beneath steering wheel.

Gasoline tank is located beneath driver's seat and has a capacity of 25 gals. Feed to the carburetor is by gravity.

Drive Line

The clutch is of cone type, constructed of aluminum and faced with chrome tanned leather, directly engaging the flywheel.



Nevada Front-Wheel Drive and Steer

Without grease housing over gears. This shows how the drive is transmitted through the steering knuckle without using universal joints.

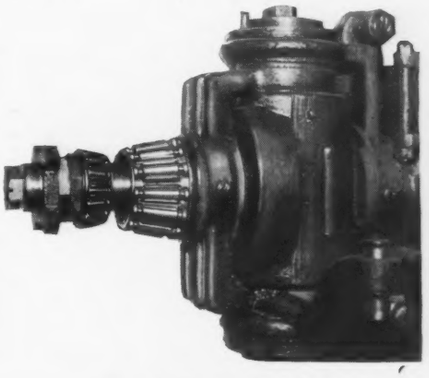
Transmission is of the non-direct drive, constant mesh, individual clutch type, giving three speeds forward and reverse. New Departure bearings are used throughout the transmission. The lay shaft is connected through Spicer joints to the front and rear axles, the machine being provided with center differential to equalize the front and rear driving units.

The two axles are practical duplicates, both being of the full-floating type, and resemble the ordinary full-floating axles, with the exception that their differentials do not run in the center, being located a trifle left of center, and the front axle is equipped with a very simple power transmitting device.

The steering knuckles on the front axle are similar to the usual type, consisting of a yoke at the end of the axle tube, through which passes a king bolt, on which revolves a solid wheel spindle, thereby making the axle floating. To the knuckle which surrounds the king bolt is revolvably disposed a double bevel pinion. The lower teeth of this bevel pinion are engaged by a bevel pinion at the end of the axle shaft, which is disposed within the axle tube. The upper teeth mesh with a larger bevel gear, which gear is fastened to a stub shaft extending through the front wheel to the outer edge of hub shaft, which is squared at the end, and connected with a square spider to the wheel. This shaft, as well as all other wearing surfaces in their front and rear axles, are supported by Timken roller bearings of ample capacity for the requirements. The entire mechanism in the front axle is suitably encased with a grease housing.

Provision is also made for hauling trailers, and the tractive power of this type of vehicle makes it especially adapted for this work.

Springs are full platform rear, semi-elliptic front, hung in patented spring shackles.



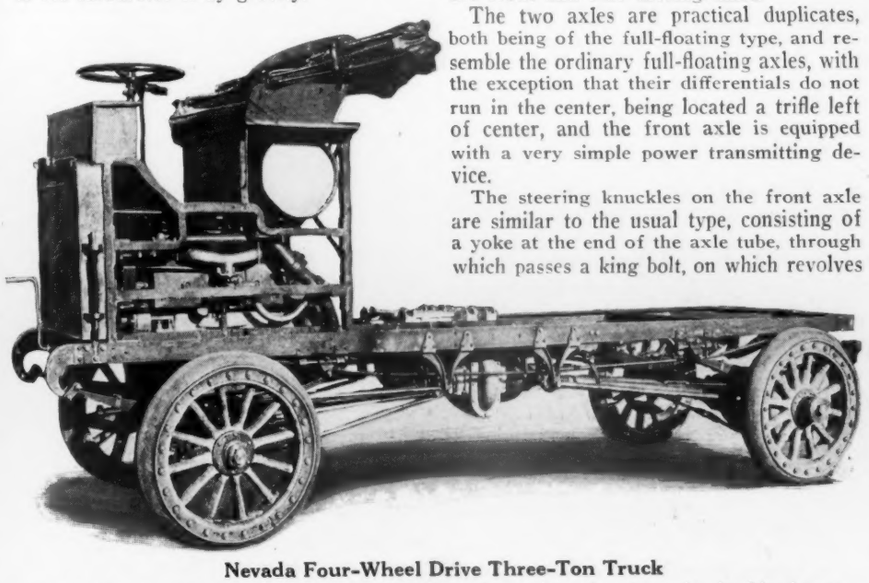
Nevada Drive Knuckle

With grease housing in place. Showing use of tapered roller bearings for the wheels. The driving cam can be seen at the outer end of the spindle.

The service or running brakes are of the external contracting type on the drive shaft, braking on all four wheels, and is operated by pedal. The emergency brake is of internal expanding type, with two brake shoes expanding against the inner circumference of larger rear wheel drums, controlled by a hand lever at the driver's right side.

Wheels are of artillery type with S. A. E. demountable rims, fitted with 36x6 in. tires, single, in front and rear.

Wheelbase is 142 in., tread 56 in., weight of chassis 6900 lbs., turning radius 44 ft.



Nevada Four-Wheel Drive Three-Ton Truck

Left-side view of chassis, showing shafts and radius rods to axles and engine under the driver's seat

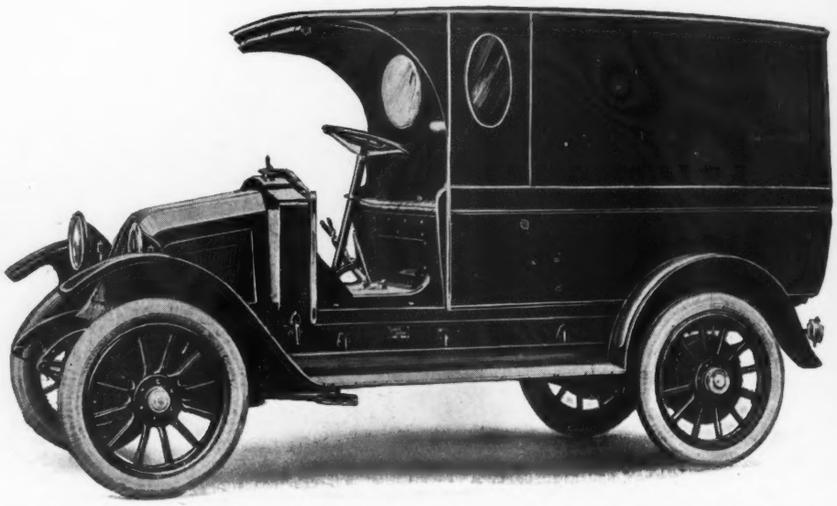
The CCJ leads in circulation, advertising and prestige

Lippard-Stewart Adds a One Thousand Pound Worm-Drive Truck to Its Line

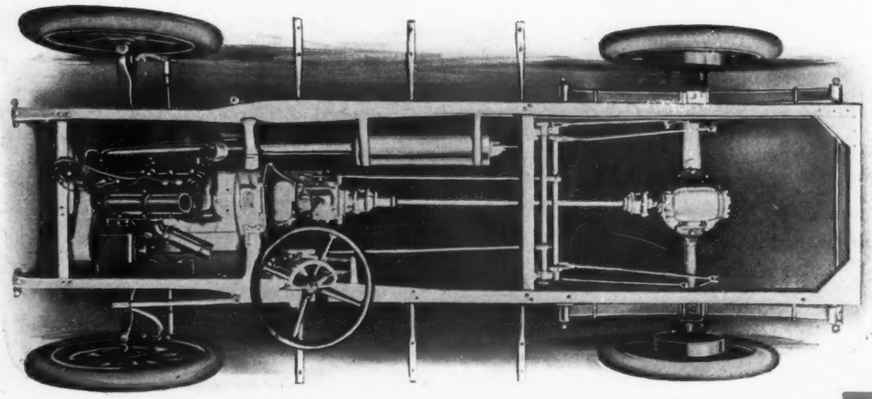
THE Lippard-Stewart Motor Car Company, Buffalo, N. Y., has announced an addition to its line of commercial cars in the 1000 lb. Worm Drive Model which embodies the latest practice and refinements in commercial car construction. The same measure of quality which characterizes the other Lippard-Stewart models, the 1500-, 2000-, 3000- and 4000-lb. sizes, has been incorporated in this new model.

Engine

The engine is of the vertical, four-cylinder, four-cycle, water-cooled type, in a unit with the transmission. It is supported at three points, a trunnion being incorporated at the front end of the engine and two arms attaching to the main frame at the flywheel housing of the engine. The cylinders are 3¼ in. bore by 5 in. stroke, cast en bloc, the cylinder and valve passages being entirely water-jacketed, the water inlet being located at the center of the cylinders, opposite the valves. The cylinder casting is made with detachable head, allowing space for large valves and insuring perfect setting of cores and even thickness of cylinder walls. The cylinder head being of the detachable type, can be readily removed, giving easy access to the cylinders and valves. The valves, located on the right side of the engine, are fully enclosed with removable cover plates. The pistons are special gray iron castings, three-ring construction; the wrist pins of steel tube, hardened, heat-treated and ground to size. Connecting rods are of the split type; cap bearings retained by two nickel steel bolts. The rods are fitted with extra large bearing surfaces of white metal, 1¾x2⅛ in., and adjusted by means of brass copper shims. The timing gears are helically cut. Crankcase and oil pan made of aluminum, the upper half of the crankcase supporting the crankshaft bearings, allowing ready removal of oil pan for bearing adjustment. Lubrication is a combination force feed and splash system, accomplished by means of a plunger pump driven by an eccentric on the camshaft, pumping oil from the reservoir through a wire gauze to the front end of the engine, filling the troughs provided for each connecting rod, which carries a tube dipping a small amount at each revolution. The surplus oil returns to the oil reservoir. An oil gage indicates the amount of oil carried. The carburetor is a Zenith with throttle operated by hand lever on steering column and foot accelerator. Ignition is furnished by an Atwater-Kent automatic advance Unisparker, current being supplied through the starting and lighting storage battery. Cooling is by means of the thermo-syphon system, with a Renault type radiator located at the dash, fan circulation.



Chassis View of New Lippard-Stewart One Thousand Pound Worm-Drive Truck
This is a new size which has been added to the Lippard-Stewart line. The illustration shows a panel body fitted. An express body is also furnished on the same chassis

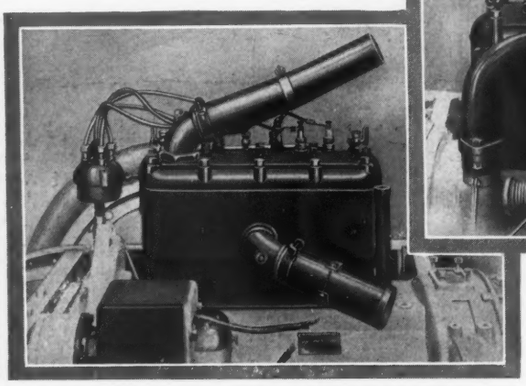


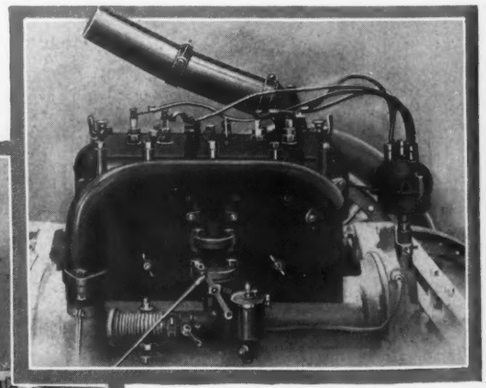
Top View of Lippard-Stewart One Thousand Pound Chassis
This view shows clearly the arrangement of the various units, equalized brakes, worm-drive rear axle, etc.

Clutch and Transmission

The clutch is leather faced, cone, with adjustable spring inserts, enclosed in bell housing. Clutch tension is adjustable by means of three exposed and easily gotten at helical springs.

The transmission is in a unit with the engine and is of the sliding gear, selective type, three speeds forward and one reverse; direct drive on high speed.





Lippard-Stewart Engine
Block cylinders with removable head; Atwater Kent ignition, and hot-air carburetor connection.

The CCJ has most advertisers because it gives them biggest returns

Transmission main and countershafts mounted on roller bearings. Control, center type, with left-side drive. Gears are ¾ in. face, heat-treated nickel steel.

Steering Gear, Frame, Springs, Etc.

The steering gear is of the worm and nut type, 17 in. hand wheel; control throttle only, ignition taken care of by automatic spark advance feature.

The frame is open hearth, pressed steel, of extra heavy section, the dimensions of same being 4 in. deep, 1¾ in. wide, 5-32 in. stock and 3½ in. wide at the point of maximum stress.

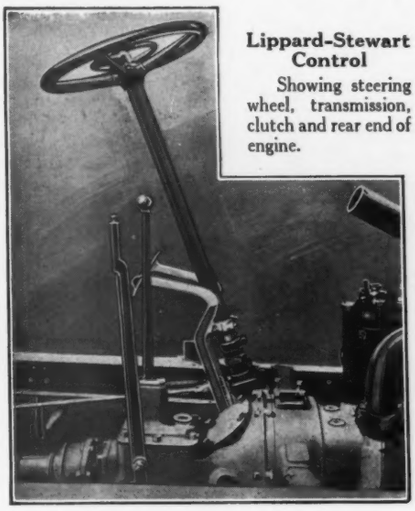
Springs are semi-elliptic all around, of extra length and flexibility, front being 38x 1¾ in. and the rear 50x2 in. The spring eyes are bronze-bushed and spring bolts provided with oil bolts and oiling device. Springs are of high carbon steel, heat-treated.

Wheels are of artillery type, wood. Sizes of spokes 1 7-16 in. front and 1½ in. rear. Tires of pneumatic type, 33x4 in. front and rear, equipped with demountable rims.

Starting and lighting system is furnished as standard equipment, this being of the single unit, 12 volt type, with engine-generator connected to the crankshaft of the engine by means of a silent chain encased in an aluminum chain housing. Lubrication by means of oil splash from the pump overflow.

The gasoline tank is 10 gallons capacity, located under seat. Wheelbase is 106 in., tread 56 in.

Two types of bodies are furnished as standard, panel and express. The chassis price is $1000, complete with equipment, including front electric headlights equipped with dimmers, horn, tool kit, tire pump, tire repair outfit fenders, and full length running boards. The load capacity is 1000 lbs., the chassis complete weighing 1950 lbs.



Lippard-Stewart Control

Showing steering wheel, transmission, clutch and rear end of engine.

Drive

Drive is of the shaft type, through two Spicer universal joints. Driving and torque are taken through the springs.

The front axle is of "I" beam section, heavy drop forging type with wheels mounted on Timken Roller Bearings. Front axle is of Timken make. The rear axle is Timken worm drive with 6: 1 reduction. The worm and gear are of the straight type of Timken-David Brown manufacture. Rear axle is three-quarters floating type with fixed drive shafts of heat-treated nickel steel. Differential, worm, gear and wheels are mounted on Timken Roller Bearings.

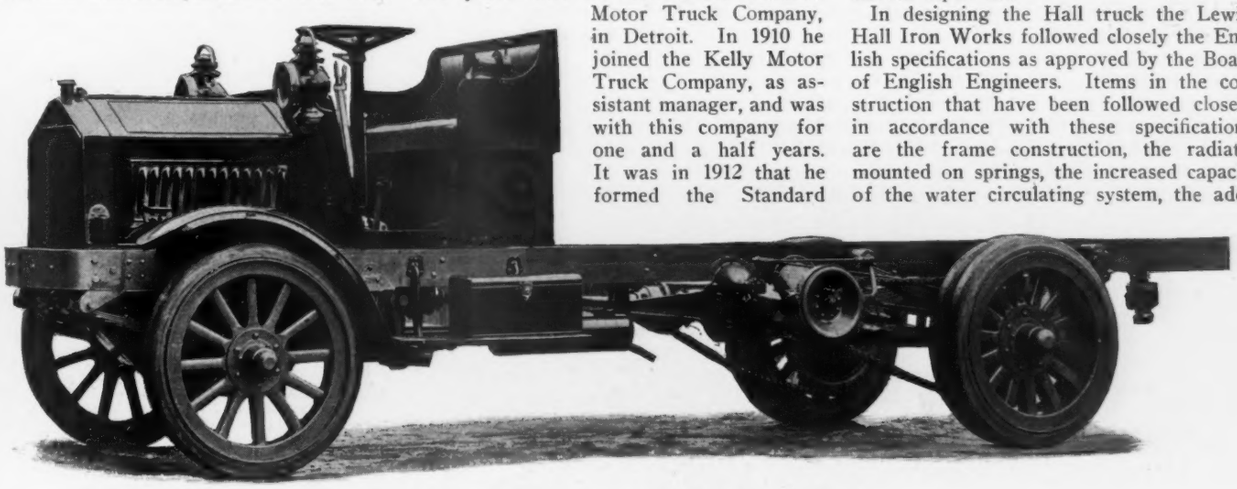
The brakes are double-acting type, located on rear wheels and are 13½ in. in diameter, 2 in. wide. A unique construction is incorporated in that emergency and service brakes are internal expanding in a single width drum, one-half of the drum surface being devoted to each set of brakes. The brakes are of the open type, readily cleaned and adjusted.

Hall Three and a Half Ton Truck: A Newcomer in the Truck Field

ENTRY of the Lewis-Hall Iron Works, of Detroit, into the commercial car manufacturing field has just been announced. This company has a large factory at Ferry Avenue and the Grand Trunk Railroad. It also has a most complete and thoroughly up-to-date plant for the machining of parts, and will build the Hall chassis complete under its own supervision. The present company are successors to the structural steel business formerly conducted by Henry B. Lewis for the past twenty years or more, and was incorporated in 1914 with Henry B. Lewis as president, and Harry S. Hall, vice-president. Upon entering the field of motor truck manufacturing January 13th last, W. K. Ackerman, a veteran engineer of the automobile field, became associated with the company, and immediately started upon the design of the three and a half ton Hall truck, particulars of which have just been made known. Mr. Ackerman, entered the automobile business in 1899, when he constructed two model cars for Judge C. H. Wisner of Flint. He later entered the employ of the Cadillac Motor Car Company as draughtsman, and two years later he formed the Reliance Motor Truck Company, in Detroit. In 1910 he joined the Kelly Motor Truck Company, as assistant manager, and was with this company for one and a half years. It was in 1912 that he formed the Standard Motor Truck Company, in Detroit. He retired from active participation in this company about January 1, 1915, to become connected with the Lewis-Hall Iron Works.

The work of designing the first Hall truck was started January 13th. Immediately upon its completion it was placed under severe tests in and around Detroit under heavy loads. Its success was pronounced, and Guy Lewin, London, England, one of the leading automobile dealers in England, immediately purchased the original truck, and this was shipped March 9th to England. Active manufacturing was started April 1st.

In designing the Hall truck the Lewis-Hall Iron Works followed closely the English specifications as approved by the Board of English Engineers. Items in the construction that have been followed closely, in accordance with these specifications, are the frame construction, the radiator mounted on springs, the increased capacity of the water circulating system, the addi-



Side View of Hall Three and a Half Ton Chassis

Radiator is spring-suspended; wheels artillery type; brakes operate on rear wheels and jackshaft. The construction of this truck follows largely the findings of the Board of English Engineers

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tional fuel supply which gives this truck a capacity of 32 gallons, English tapered point springs, and metric wheels and spark plugs, together with many other important items.

The Hall truck may be said to be the result of many months' experience with American trucks on the European battlefields. Trucks that have been shipped to the European war developed certain weaknesses or certain failures in important parts, and the Board of English Engineers took all of these into consideration in drawing up specifications for a truck to meet the requisites of the severe service in Europe during war times. The Lewis-Hall Iron Works took into consideration all of these points in bringing forth the present truck.

quired. It is in this way that the economy of fuel is obtained. The Kramer governor is of the unit type entirely closed and sealed. Readjustment is prevented. The governor is set to the maximum engine power at 1140 r.p.m.

Engine

The engine used in the Hall is the Continental Model E, 4½x5½ in. unit power plant construction. Lubrication is by combined force feed and splash, oil capacity 13 pints. The motor will develop 45 h.p. The valves are poppet and 2¼ in. in diameter. Single ignition is used, and the magneto employed is of waterproof type.

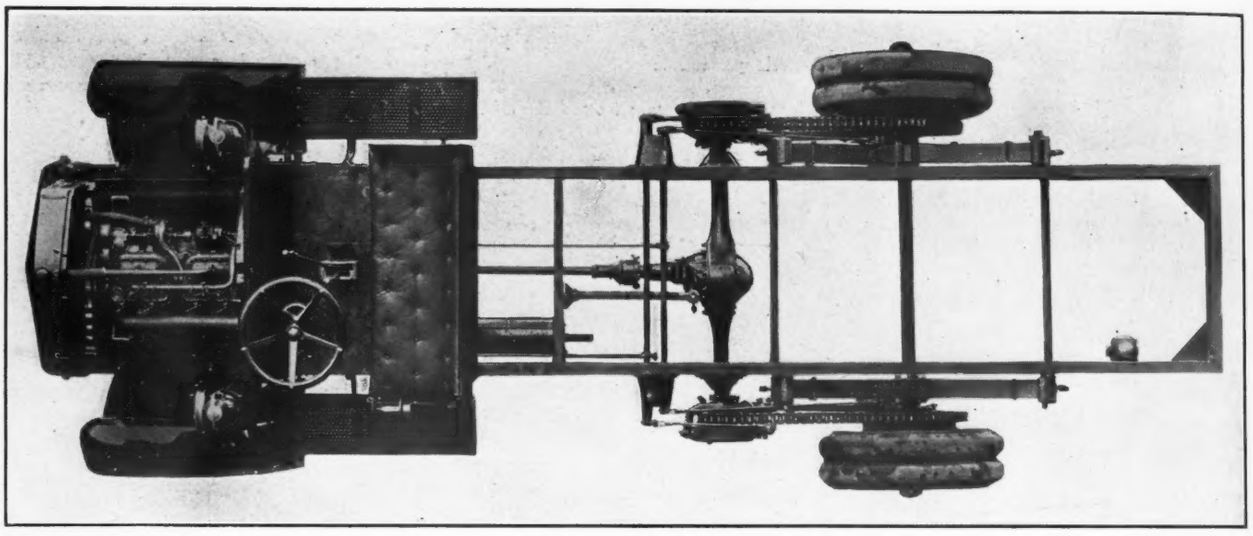
An unusually large and special Mayo radiator is used giving great cooling capacity. of the Timken type. Timken roller bearings are used both front and rear.

There are four brakes, two on the countershaft on 12-in. drums, and two on the rear wheels. The latter are of the internal expanding type in 18-in. drums. The springs are mounted as close to the bearings as is possible.

The chains are roller with detached links 1½-in. pitch. The roller is ⅞ in. and 1 in. wide. Either Diamond or Whitney chains are fitted.

The steering gear is a Gemmer worm and sector, and is designed for five-ton work. The sprockets carry from 15 to 18 teeth in front and 48 teeth in the rear.

The jackshaft has a Timken ratio of 3 3/7 to 1, or is optional with the pur-



Top View of Hall Three and a Half Ton Chassis

Four-cylinder Continental engine; chain drive to rear wheels from jackshaft; left-side drive, center control; extra heavy construction. Standard chassis, $2800

American business requirements were also taken into consideration. The many years of experience of the builders brought them to the realization of the necessities of the American business world. The practice of adapting more or less pleasure car methods was entirely avoided in the designing of this truck.

Chassis Details

The Hall frames for both the chain and worm-driven types are the product of the Lewis-Hall Iron Works. These frames are manufactured complete at the big Detroit plant. Special channel rolled steel, 6x7/16 in. thick, is used throughout.

The Hall chasses are equipped with electric light and electric starter outfits complete, and an extra charge of $150 is made in this event. The regular standard chassis lists at $2800. In the design of the Hall the makers have figured upon fuel economy very carefully, and the early tests have demonstrated the possibilities of securing from 8 to 9 miles to the gallon regularly. The chassis is equipped with a novel combination of vaporizer and governor, the former of the Zenith type. This is designed with a special by-pass to take fuel used on the idle or slow speeds through the by-pass into the governor butterfly valve. A Kramer governor is employed. The butterfly valve acts as a port opening and closes the auxiliary by-pass as re-

This radiator is mounted on a special spring suspension device which carries the radiator between two coil springs placed below and above the carrying point. The rebound as well as the road shock are taken by this mounting. Water circulation is by centrifugal pump mounted on the motor base and is driven at engine speed.

Clutch and Transmission

The clutch is of the multiple dry disc construction, Brown-Lipe make, and the Raybestos and steel surfacings are entirely enclosed.

The transmission is of the progressive three-speed and reverse type, mountings in unit with the motor. The gears are of nickel steel as are also the shafts, and these are mounted on Timken roller bearings.

Other Details

The wheelbase is 114 in., standard measurement, with an option of 14 ft., 16 ft. or 18 ft. On the standard model of the Hall a loading space of 12 ft. 1 in. is provided without the body. Frames may be had upon order up to 24 ft. in length to meet exact hauling conditions of customers.

The steel seat and the dash which are a steel unit electric welded are equipped with sockets of a substantial design to carry the driver's cab top.

The axles, both front and rear, are steel drop forgings especially heavy. They are

chaser. The gear ratio to the rear wheel is 9.39 to 1. Other ratios will be furnished at the option of the purchaser to meet road and hauling conditions.

The rear springs are 3½ in. wide and 52 in. long, and the front springs 2½ in. wide and 45 in. long. Perfection springs are employed throughout, and are semi-elliptic front and rear. These springs are bronze bushed. The spring bolts are center oiled and fitted with grease cups.

Wheels are provided in either S. A. E. standard or metric size. The front wheels are 36x5 and are provided with single spokes 12x2½ in., and the rear wheels are 36x5 provided with dual spokes 14x3½ in. Tires are solid 36x5 in. single front, 36x5 in. dual rear. Metric sizes are provided if desired.

The tread of the Hall is 72 in. at the rear with 5 in. dual tires, and 65 in. at the front with 5 in. single tires.

The gasoline tank is especially constructed for strength with all seams welded. The capacity of the tank is 31 gallons, giving the truck a mileage on one load of gasoline of approximately 250 miles.

The magneto used is the Eiseman. Universal joints are used throughout, and these are either Spicer or Kinsler-Bennett type.

The Hall chassis weighs 6100 lbs. It will be fitted with rear springs of the five-ton capacity at an extra charge of $10.

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A New Model International Truck of One Ton Capacity

THE International Harvester Company of America, Chicago, Ill., has announced a new model of 2000 lbs. capacity, which now makes the International line consist of 1000-, 1500- and 2000-lb. trucks. The new model is known as Model F, and is fitted with open express type body with flareboards and upholstered, folding lazy-back seats. The inside dimensions of the body are 108 in. long, 44 in. wide, 12 in. deep, with 6 in. flareboards.

Engine

The engine is a four-cylinder unit, with L-head cylinders cast enbloc, 3½ in. bore and 5½ in. stroke. The engine and transmission are both mounted on a subframe, which is suspended from three points on the main frame, the engine being in front of the radiator, where it is readily accessible, and covered with Renault type hood. The valve mechanism is all enclosed, and the timing gears are of helical type. Cooling is by water, employing a centrifugal pump and large vertical tube radiator and fan, located next to the dash. The pump is located on the cross-shaft in front of the engine.

The three crankshaft bearings are of ample size and are babbit lined. The rear is 1¾x4 in., center, 1¾x2¼ in., and the front 1¾x3¼ in. The camshaft has large phosphor bronze bushings and the connecting rod is babbited on the big end, phosphor bronze on hardened steel at small end.

Forced lubrication by means of a gear pump to the main bearings, with overflow to troughs and crankcase, into which the lower ends of the connecting rods dip, making a splash system to cylinders and crankshaft.

Ignition is by means of a high tension magneto located on the cross-shaft in the front of the engine. The spark advance is on the steering wheel. Carburetion is accomplished by means of a Model H 1¼ in. Holly, with adjustable hot air supply.

Other Details

Transmission is of selective sliding gear type, providing three speeds forward and reverse, direct drive being on high gear. The clutch is a leather-faced cone, with springs provided under the leather to allow of easy engagement. Drive is through a tubular propellor-shaft which is fitted with Spicer universal joints at each end.

The front axle is of I-beam section, .35 carbon steel heat treated. Steering pivots are of large size, hardened and ground and work in hardened bushings, provided with ample lubricating facilities. The steering knuckle is nickel steel heat treated. Rear axle is solid I-beam drop forging 3x2 in.

This axle, of Torbensen make supplies one solid member for carrying the load and a separate one for transmitting the power to the wheel. The carrying member is of drop forged steel with the wheels running on roller bearings. The jackshaft, or power transmitting axle, is securely attached to the rear of this forging, and this unit is relieved of all carrying strain by the forged member, leaving the jackshaft purely for the purpose of propulsion.

All of the driving mechanism is enclosed, affording perfect cleanliness, quiet working and efficient lubrication.

New International Model F; One Ton Capacity
Four-cylinder engine, 3½ in. bore, 5½ in. stroke; selective, sliding, three-speed transmission; cone clutch, etc.

The wheels are of artillery type, 36 in. in diameter, the rears being 4 in. in section, the front being 3½ in. Tires are S. A. E. standard demountable, and each wheel is provided with two roller bearings.

The springs are half elliptic in front, 2¼x40 in., the rear being platform type 2½ in. wide, and consisting, as usual, of three springs.

Control

Drive is on left side, with spark and throttle levers on steering wheel and foot accelerator on the toe board. Service brake and clutch are operated by conventional foot pedals. The gear change and emergency brake are operated by levers located in the center of the driving compartment. The service or foot brakes are of the external contracting type, while the emergency or hand brakes are of the internal expanding type. Both are asbestos faced and operate on the rear wheel drums.

The gasoline capacity is 17 gallons, with a reserve capacity of 2 gallons. The tank is located under the driver's seat and a gage on the dash informs the driver at all times as to the state of the gasoline supply. Some of the leading dimensions are as follows:

Height of loading platform without load, 34½ in.; loading platform loaded to capacity, 32 in.; body overhang over rear axle, 47¼ in.; body overhang over frame, 27½ in.; length of chassis over all, 173 in.; length of truck including body over all, 198 in.

Equipment

The standard equipment on Model F includes Bosch high tension magneto, two gas head lights, Prest-O-Lite gas tank, oil lamps, horn and tools. On special order and at additional cost, the following will also be furnished:

Skid chains, glass windshield, storage battery, combination speedometer and odometer, electric lighting equipment, cab top for seat or full length top. Pneumatic tires may also be had on order.

White Good-Roads Truck Used in Chatham County, Ga.
As high as five trailers, each carrying fifteen thousand pounds, are used with this truck. The average tonnage handled during a test of 411 hours was 89.4 a day

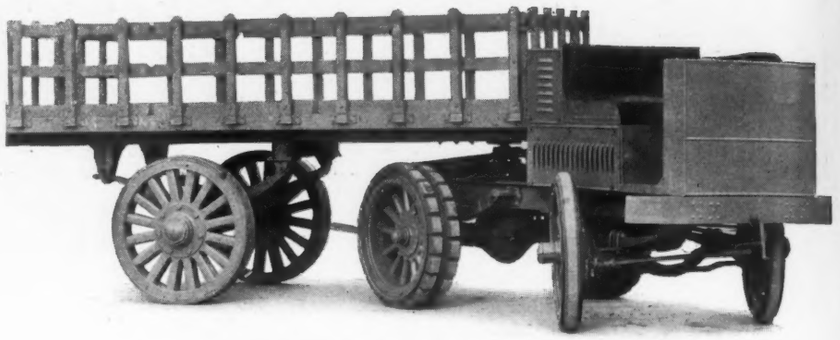
The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

The Dominion Truck or Tractor

THE Dominion Motor Truck Company, of Detroit, Mich., has been organized to manufacture the Dominion truck, which is being made in Canada by the New Dominion Motors, Ltd., Walkerville, Ont.

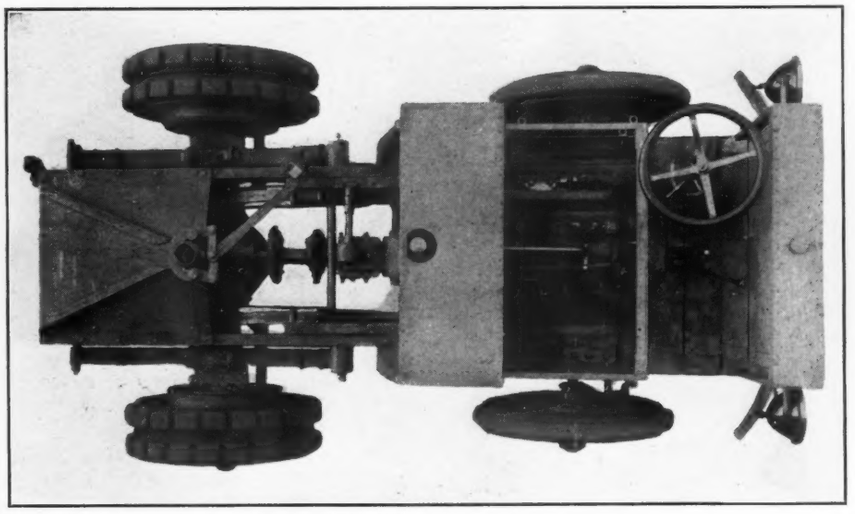
While called a truck, this device is more of a tractor than a truck as can easily be seen from the illustrations. It possesses the usual advantages of this type of vehicle, viz.: convenience of having a number of different trailers at low cost, these trailers being, if desirable, of different types, for hauling different kinds of materials, and the advantage of pulling the load instead of pushing it.

The construction is such that the front tires never carry any portion of the load, but the rear tires carry what would be the front tire load in the conventional type of truck. The steel tires of the trailer carry the big burden.



The Dominion Tractor and Trailer

Has a ball and socket swiveling connection, steel-tired trailer and rubber-tired tractor. Tractor may also be used for towing other vehicles

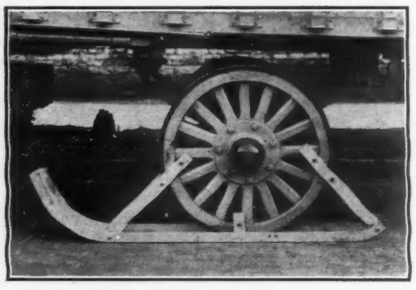


Top View of the Dominion

Showing the engine and other characteristic parts. Note the toggle lock arrangement, which locks the ball of the trailer into the socket of the tractor by means of a hand lever extending to side of frame. This can be padlocked to place.

Specifications

On forward motion, the tractor and trailer will turn in a 14 ft. radius, and by backing once, can be turned around in a 9 ft. 6 in. radius. The rear of the vehicle is fitted with a steel plate fastened to both side rails of the frame and the back cross member. This plate is made in the form of a low pyramid and at its apex is a socket which receives the ball which is attached to the front under side of the trailer. No matter where the ball lands, it is guided straight to the socket by side flanges. There is also a coupling at the rear to permit of towing other vehicles.



Runner for Snow

Used on the trailer of the Dominion Tractor and Trailer

Engine, Transmission and Clutch

The engine is a Continental Model E, four cylinder, 4½ in. bore and 5½ in. stroke, and is fitted with an automatic governor.

The clutch is a large multiple disc, discs being lined with Raybestos. The entire clutch is enclosed in the flywheel housing, is protected from dirt and is provided with ample means of lubrication.

The transmission is of selective sliding type, three speeds forward and one reverse. The transmission is combined with the engine and clutch, forming a unit power plant. Shafts revolve on high grade imported annular bearings.

Axles, Brakes and Springs

Both front and rear axles are of Sheldon make, the front being of I-beam section, fitted with taper roller bearings, capacity 3700 lbs. The rear is a worm gear drive type with imported type worm and gear. The worm is mounted on annular ball bearings with a separate thrust bearing to receive all the thrust load applied to the worm shaft. The capacity is 12,000 lbs.

Springs are semi-elliptic 40x2½ in. front, 48x3 in. rear and 54x3 in. on trailer.

Other Details

Other leading specifications are: 6 in. channel section frame, Schebler Model R Carburetor, 14 gal. gasoline tank in front of engine, generator and storage battery for electric lights and ignition, spring suspended tubular radiator located in back of engine, tires 36x4 in. front, 36x4 in. dual rear, and 40x6 with 1 in. steel tires on trailer, 68 in. wheelbase, capacity 0 to 6 tons on trailer.

The equipment is complete and price is $3800 f. o. b. Detroit.

United States Army Wireless Outfit

A portable field wireless outfit used by the United States Army. It is mounted on a Jeffery Quad truck and has a sending radius of 250 miles. The power is furnished by the truck's engine, coupled to a two-kilowatt generator.

The CCJ leads in circulation, advertising and prestige

Motor Truck Design and Construction Made Plain

Advantages and Disadvantages of Different Types Discussed

By C. T. SCHAEFER, Member Society Automobile Engineers

This is the fifteenth installment of a series of articles by this well-known writer, covering in a non-technical way the various constructions now current practice in commercial car design. These articles take up, in order, the general types of chassis, the advantages and disadvantages of each, illustrated by simple diagrams, and in logical order, motor construction, ignition, carburetion, cooling, lubrication, etc., until each part of the truck has been dealt with.

PART XV

THE FINAL DRIVE

(Continued from our April issue.)

[The length of this subject will necessitate its being continued through several issues.—Ed.]

The Worm Drive

In spite of bitter opposition, worm drive has made great strides during the past year, quite a number of makers having added worm-driven models to their line, good axles of this type being obtainable. Several of the older companies are building their own axle, amongst these being the Pierce and Locomobile Companies, the former adding a two-ton model, while the latter has recently announced three- and four-ton models.

Fig. 19 will serve to illustrate the Pierce axle which is of the full-floating type, with the worm mounted above the wheel. The worm, worm wheel and spur gear differential are mounted on ball bearings and assembled as a unit with the cover. This construction permits the removal of the entire unit without disturbing the balance of the axle, as shown in the illustration. The housing is a heavy steel casting reinforced by tubes which carry the wheel bearing and extend beyond the spring seats. The emergency brakes are mounted in the rear wheels and the service brake is located back of the transmission. Thrust is taken on radius rods and the torque load on a heavy torque arm. The road wheel is driven through a squared shaft and driving flange bolted to the hub.

The worm-drive axle recently introduced by the Locomobile Company is illustrated in Fig. 20, and is also of the full-floating type. However, it differs from the above in that a bevel gear differential is used, while the housing is divided into three parts, consisting of a center housing and two ends which are bolted together. Reinforcing tubes are also used, which carry the wheel bearings and extend to points just outside the differential bearings. The ends of these carry a series of packing washers to prevent the oil working out onto the brakes. The outer ends of the housing have spherical bearings for the radius rods, while the spring seats pivot on bronze bushings. The spring is mounted outside the frame while the radius rods are placed directly under the side frame members. The worm is mounted above the wheel and, together with the differential and bearings, forms a unit with the cover. A heavy truss rod is anchored to the housing inside the brake drum and provided with a turnbuckle for adjustment. The wheels are mounted on Timken heavy roller bearings, while the driving unit is mounted on ball bearings and provided with suitable ball thrust bearings. The drive shafts are of the ten-spline type, and drive the wheels through flanges bolted to the wheel hubs. Attention might be called to the method of reducing the weight, by lightening the reinforcing tube. The inner wall of this tube tapers from the end to the center of spring seat, from this point to just inside the inner-wheel bearing where the greatest load comes; they are of maximum thickness and bronzed bushed.

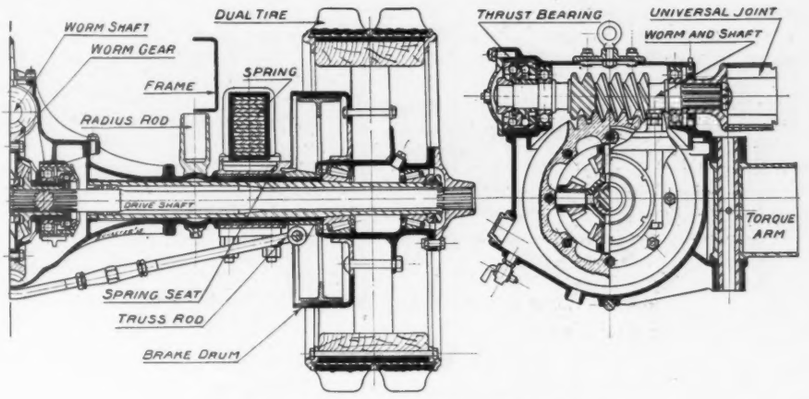


Fig. 19. Pierce-Arrow Worm-Drive Axle
Showing ease of removal of worm, worm wheel and differential unit

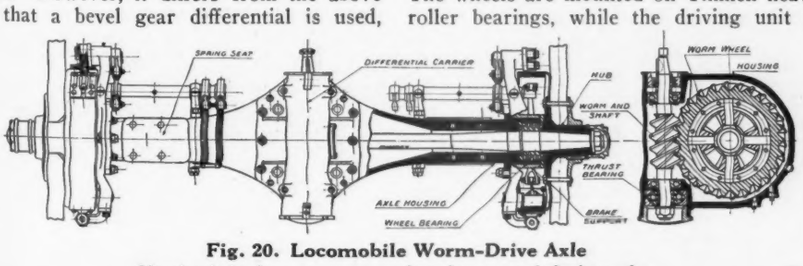


Fig. 20. Locomobile Worm-Drive Axle
Housing is in three parts, two ends and a center, bolted together

The Timken David Brown axle used in a number of commercial cars is depicted in Fig. 21, being similar in construction to those described above, with the worm, worm wheel, differential and their bearings assembled into a unit with the cover. However, in this axle the well-known Timken bearings are used throughout, and, owing to their ability to carry thrust loads, it is claimed no thrust bearings are necessary. To the writer's knowledge this company is the only one resorting to roller bearings for mounting of the worm. The flange for driving the wheels is forged integral with the drive shaft, while the general construction is along conventional lines.

Another worm drive axle used by several commercial car builders is the Sheldon axle Fig. 22. It is also constructed

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along conventional lines, having the differential and worm gear a unit. However, it is of the semi-floating type, and the housing, which is cast in one piece, is so arranged that either over or underslung springs may be used. As the axle is of the semi-floating type, the housing is made of liberal proportion and the weight is carried on the drive shaft, while a ball bearing is mounted inside of the wheel which is attached and driven by means of a long taper and key. This is clearly shown in the illustrations. The features of semi-floating axles can perhaps be best described by comparison with the full-floating and three-quarter-floating types.

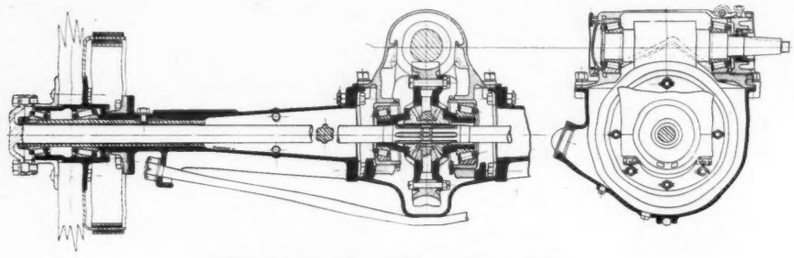

Fig. 21. Timken Worm-Drive Axle
This axle employs roller bearings throughout

The Packard worm drive axle, Fig. 23, also has a three-piece housing, with the differential and driving unit mounted in a unit with the cover. The differential is spur gear type, and the entire driving unit is mounted on ball bearings and provided with suitable thrust bearings. As in the construction described above, the worm is mounted above the wheel. The housing is massive steel construction, well ribbed to provide maximum strength. The entire construction is arranged for straight line drive from the transmission through two universals, while the thrust is taken by radius rods and the torque by a heavy torque arm.

Rear Axle Types

Shaft-driven commercial car axles may be classified according to the arrangement of the wheel bearings. If the end of the drive shaft next to the wheel has a bearing directly upon it, the axle is then classed as semi-floating type. This type of axles possesses some advantages in cost of manufacture and simplicity, and is the lightest axle for its strength. The great strains imposed upon the bearings and housing of the full-floating type in skidding against obstructions are much less in the semi-floating type, because of the greater distance between bearings. However, there is much difference of opinion as to the relative advantages of the various types of axles.

In the semi-floating axle, the drive shaft carries the weight of the vehicle and must also resist torsional strain.

In order to make an axle in which only torsional driving strains are imposed upon the drive shaft—thus approximating some advantages of the dead rear axle—a construction is used wherein each wheel is mounted outside the axle housing, and the drive is taken through a central shaft connected to the hub by either a jaw clutch or flange bolted to the hub. This is known as the full-floating type of axle. It has the advantage of having the axle shaft free from all lateral strains, thus greatly reducing the danger of breakage and of bending, the latter causing the wheel to wabble. Even if the shaft is broken, the wheel is still securely mounted on the axle housing, so that the axle does not drop to the ground. The construction is such that the drive shafts can be withdrawn and even the differential dismounted without removing the wheels from the axle, or the axle from the car.

The jaw clutch for driving the wheel has the advantage of being more easily withdrawn from the axle and affords more freedom to allow for misaligning parts, while the flange drive removes all chances of noise sometimes made by jaw clutches, and is claimed to be slightly less expensive to construct.

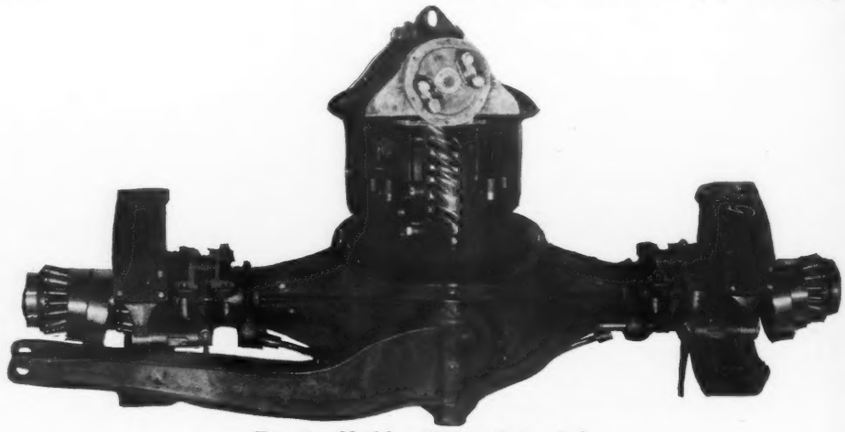

Fig. 22. Sheldon Worm-Drive Axle
This unit is semi-floating type

The three-quarter-floating axle is a compromise between the semi-floating and full-floating types. It has the wheel mounted on a single bearing outside the axle housing on a reinforcing tube, and kept in alignment by being rigidly attached to the driving shaft by either a key, as in the semi-floating type, or a flanged connection as in one style of full-floating axle. According to the type of bearing employed at the wheel, the axle shaft is held in place either by the wheel bearing or by some sort of a lock near the differential.

As in most compromises, this type possesses some of the advantages of each of the others. No dead load is placed on the axle shaft, but the skidding strains are little, if any, different on the bearings and shafts than with the semi-floating type. As in the semi-floating axle, any type of bearing can be used, and the weight may be less than the full-floating axle. When the wheel bearings are of a type suitable to take end thrust, they are usually so mounted as to hold the wheel in place on the axle end, and the shaft is connected by a flange. The shaft can then be removed without disturbing the wheel.

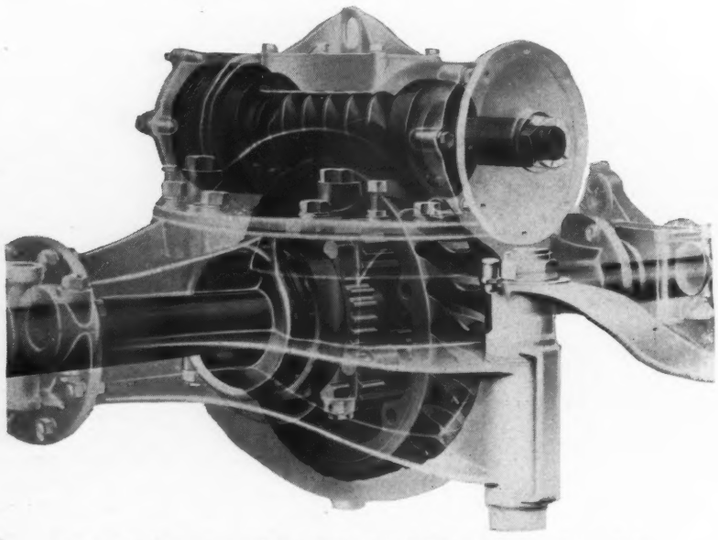

Fig. 23. Phantom View of Packard Worm-Drive Rear Axle

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Worm and bevel gear axles are similar to pleasure car axles, and various parts of the other two types are also similar; however, while they are similar, their proportions are materially increased to withstand vibration.

Method of Providing for Torsion and Propulsion in Shaft-Driven Commercial Cars

At the present writing there seem to be about five methods of providing for torque and thrust loads on shaft-driven axles, as follows: (1), torque and thrust through the vehicle springs; (2), torque and thrust through triangular structure attached to a rigid cross member; (3), torque on springs, thrust on radius rods; (4), separate torque and radius rod members; (5), torque tube surrounding drive shaft and anchored to the frame by a large yoke and triangular radius rods anchored to the torque tube.

In a shaft-driven axle there are two separate torsional forces. There is first, the primary torque of the drive shaft, and the secondary torque of the axle itself. The inertia of the axle causes the shaft to react upon the gear set support in a tendency to whirl them instead of itself turning, and the inertia of the wheels on the road tends to cause the axle to whirl, instead of the wheels revolving. Owing to the reduction afforded by the gear set on the lower gears, there is a certain amount of drive-shaft torsion, even on a heavy vehicle. It is no greater however, the motor being of the same power as in a passenger vehicle, as a rule, and, as in the latter, it can be transmitted directly to the frame, the springs being the medium relied upon to absorb it.

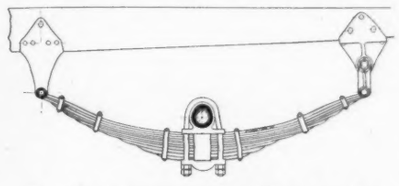


Fig. 24. Arrangement of Springs for Taking Torque and Thrust

The axle torque offers the greatest problem. In some vehicles the springs or the ordinary form of torque arm supported from the frame have proven successful, while in other cases torsion is provided for by connecting the sub-frame, upon which the complete power plant and transmission system are mounted, to the rear axle at one point and to the forward part of the frame on two points.

Propulsion may be through the swinging subframe, torque tube, springs or radius. When radius rods are used, the springs are shackled at both ends, and when the thrust is taken through the springs the front end is rigidly attached to the frame and the rear end is shackled.

There seems to be a very wide difference of opinion as to the relative merits of the various methods, and examples of each type may be found with either type of axle. The method of taking both stresses on the springs is quite popular on the light, worm-driven vehicles, while separate torque arm and radius rods seem to be popular on heavy worm-driven vehicles.

The internal gear-driven vehicles are divided between spring drive and triangular members anchored to the frame cross member for taking up these stresses. The double reduction seems to favor the worm practice, as both of these methods are found, while the bevel drive seems to favor pleasure car methods.

Fig. 24 depicts the spring construction for taking both torque and thrust loads, being used on all the Chase worm-driven models. The front ends of the springs are rigidly mounted in a heavy bracket attached to the frame, while the rear ends are shackled in the usual manner. The springs are underslung and especially designed to take these stresses, being equipped with a heavy center band and numerous rebound clips. This construction will be found on the Signal, Fremont Mais, Autocar and various other vehicles under 2-ton capacities.

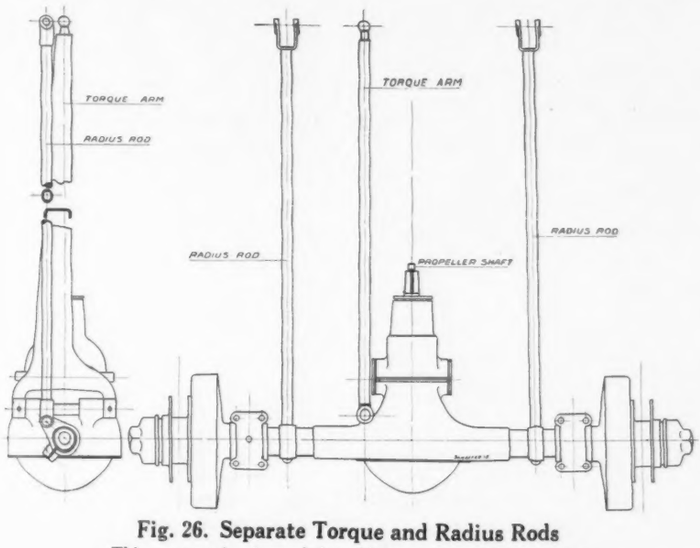


Fig. 26. Separate Torque and Radius Rods
This construction is much in evidence on worm-drive models

On the new Federal worm-drive trucks, the springs are shackled at both ends and take the torque load, while radius rods are used to take the driving thrust.

Fig. 25 illustrates the method of taking these stresses on tubular rods forming a triangular construction with the rear axle. The tubes are rigidly attached to the brake supports at the rear, and form a large ball at the forward end, which is mounted in a spherical bearing on the frame cross member, directly over or under the universal joint. This construction will be found on several internal gear models, and is also similar to the Modern worm-driven one and a half ton models, Universal, Mais, and others.

The dotted lines in this illustration show another type of triangular torque and radius rods. However, each rod is hinged separately on each side of the universal joint to the frame cross member. This construction is used on the Studebaker and G. V. internal gear-driven vehicles and the Flint double reduction drive and others.

Separate torque and radius rods are used on the Pierce, Locomobile and other worm-driven models, and the Menominee double-reduction drive, the latter being shown in Fig. 26. The torque rod is a pressed-steel, channel-shaped member, having a ball end, which is mounted between springs in a bracket hinged to the cross member, while the radius rods are of tubular section hinged to the axle and frame side rails.

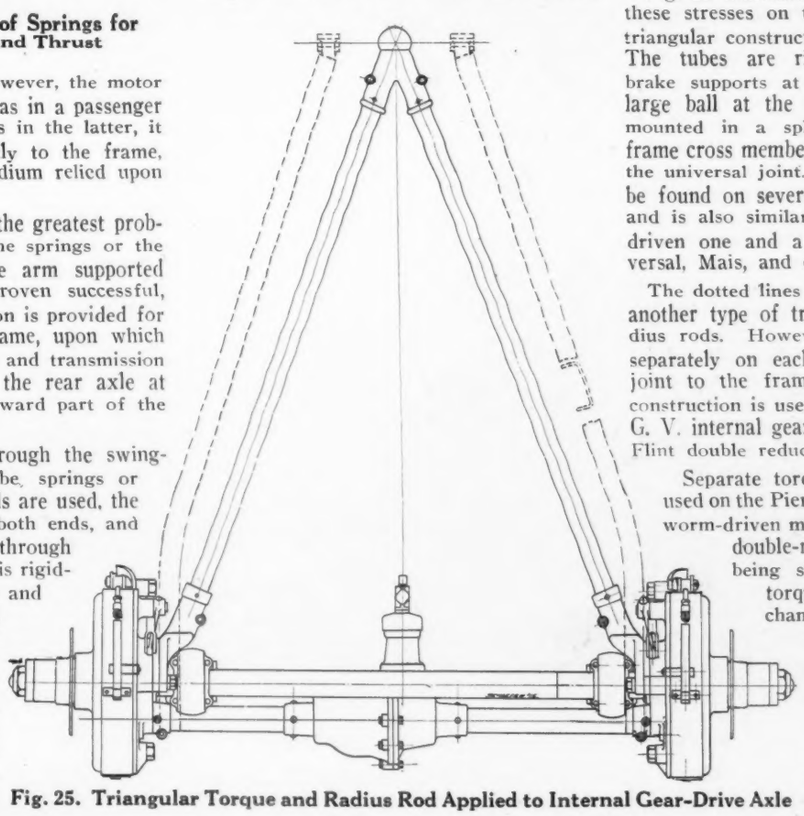


Fig. 25. Triangular Torque and Radius Rod Applied to Internal Gear-Drive Axle

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

With bevel drive axles, there are several methods in use, which follow pleasure-car practice closely. The torque tube may either surround the drive shaft and the drive be taken through the spring and the radius rod, as in the Commerce, Vim, and others, or the torque and thrust may be taken through a torque tube and radius rod hinged to the cross member, as advocated by the GMC 1500-lb. delivery car, which is illustrated in Fig. 11.

There are various arguments which can be advanced for either of these constructions, while each type seems to have its share of support amongst the manufacturers. From the writer's observations it seems to be the general tendency to let the springs perform these functions in the lighter vehicles, and to use radius and torque rods and combinations of these in the heavier models.

TRUCK PUMPS OIL ACROSS RIVER

By FRANK REED

A novel use of the Peerless 950-gal. road-oiling truck, owned by Los Angeles County, was made in the course of construction of the Scenic Drive through Topango Canyon this winter. The grades require constant use of steam shovels for heavy excavation and their fuel is oil, hauled from the wells in Los Angeles, some 20 miles by road from the construction activities. As the shovels worked up the canyon, they got beyond a bad river crossing where completion of a new bridge was being delayed until after the spring floods, in order to give practically a full year for settling of soil around the foundations and abutments.

The river crossing was a bad one, as banks are steep and water frequently runs high. Instead of running the truck across advantage was taken of its special construction, with an oil pump running inside the tank, driven by gear and chain from the truck transmission. Storage tanks, having a capacity of 10,000 gals., were located on the upper side of the river, and a 400-ft. pipe run down to the end of the good road, just below the bridge. The truck easily pumps oil through this 400 ft. of 2-in. pipe, requiring 100 lbs. pressure to fill the tanks. From the reservoir tanks the short haul is taken care of by a 200-gal. wagon-tank drawn by mules.

This same truck also demonstrated its versatility by enabling the county road force to paint the piers under a bridge with asphalt in a few hours, a job that, by the old-hand method, would have taken several days. The truck's motor drove the pump to give 125 lbs. pressure, forcing the asphalt out through a flexible hose and spray nozzle.

Peerless Truck Used to Force Oil Across a River

On the right can be seen the end of the four hundred foot pipe line, through which the truck forced the oil, by means of an oil pump inside the tank, driven from the transmission.

ONE TRUCK DOES THE WORK OF THIRTY-SIX MULES

Such is the record made by a White truck in the case of the road building work done by the County of Coahoma, Miss., during the past 2 years. When this county placed the truck in service the cost of hauling immediately dropped from $1.50 per yard to 35 cents. Where four mules pulled 2½ yds. of gravel to a load, and made only two trips per day over a 5-mile haul, this truck hauled 5 yds. per load and made from seven to eight trips each day. With one trailer the truck made five to six trips per day, hauling 9 yds. per trip. When a trailer was used the truck and trailer did the work of forty-eight to sixty mules.

A simple comparison of the work between the truck and mules is found in the record of material hauled in 1 month, viz: 24-36 mules hauled 682 yds. at a cost of $819, while the truck hauled 798 yds. at a cost of $272.

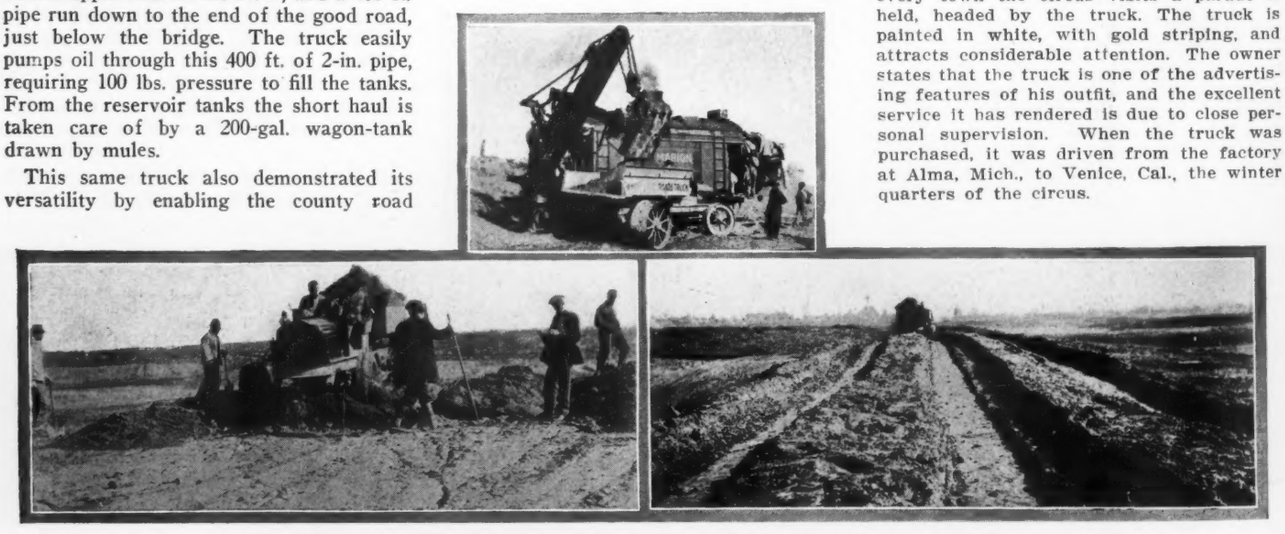
"Within the month of September, 1913," said Road Superintendent W. C. Cook, "I hauled and put down on the public road thirty-seven cars of gravel averaging 40 cu. yds. per car. The haul was between the 4- and 5-mile post from the station. For this, the county hired teams to haul 2½ cu. yds. of gravel per load at $3 per load. The teams, consisting of four to six mules to each wagon, hauled 273 loads, or 682 yds., at a cost of $819. The truck hauled 798 yds. at a cost of $272, including driver's salary, gasoline, oil and upkeep. This is the cost of hauling only. This does not constitute a full month's work, but it was done within that time."

Wide Wheels Are Used to Pack and Roll the Subgrade

In the construction of this road the entire subgrade was ploughed soft. With a full load, the truck was run over the subgrade four times and the broad steel wheels rolled the subgrade smooth. Then the gravel was dumped and spread, beginning at the point nearest to the gravel car. As the loads were hauled to the progressive dumping points, the fully loaded truck, driving over gravel that had already been dumped and spread, packed it down thoroughly. Thus the dumping and rolling are done simultaneously.

A sworn transcript of the records of the Coahoma County Board of Supervisors shows that the total amount of gravel hauled was 32,067.4 yd. miles at a total cost of $2322.52, or $.075 cost per yd. mile. The total sum included $1128 paid to the driver of the truck and the balance, $1194.52, included all gasoline, oil, repair work and garage charges.

A Republic chassis of one and a half ton capacity is being used by Al. G. Barnes, owner of a three-ring wild animal circus, to carry an expensive calliope and a lion cage through the western country. In every town the circus visits a parade is held, headed by the truck. The truck is painted in white, with gold striping, and attracts considerable attention. The owner states that the truck is one of the advertising features of his outfit, and the excellent service it has rendered is due to close personal supervision. When the truck was purchased, it was driven from the factory at Alma, Mich., to Venice, Cal., the winter quarters of the circus.



White Good-Roads Truck Which Did the Work of Thirty-six Mules

Showing the truck performing various duties in road construction work. The lower right view is particularly interesting. It shows how the broad steel wheels at the rear are made to do double duty. As the loads are hauled to the progressive dumping point, the fully loaded truck, driving over gravel that had already been dumped and spread, packed it down thoroughly. Thus the dumping and rolling are done simultaneously.

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

Extracts of Papers Read at Convention—Continued From Page 15

"CAN MANUFACTURERS HAVE A STANDARD SERVICE POLICY?"

By ALVAN MACAULEY, Vice President and General Manager, Packard Motor Car Company

THE term "service" was adopted by motor car companies in the early imperfect days of motor car development, when we were all exceedingly sensitive on the subject of repairs. So we have universally used the word "service" with the thought that it would disguise the existence of our repair departments, and give a beneficient aspect to those necessary evils. I believe that our subterfuge has reacted upon us many times, and in many ways. It would have been better, I feel sure, to have handled the situation straight out from the shoulder, calling repair departments by their right name. Then our good patrons would have expected them to take care of repairs. Their functions and activities would have been held within reasonable limits.

The term "service," as it is used in the business in which we are all engaged, covers three branches of work, as I see it:

First.—The correction, at the manufacturer's expense, of defects in material or workmanship, for which the manufacturer is properly held accountable.

Second.—The repair of vehicles that have deteriorated through use or abuse.

Third.—An indefinite something beyond legitimate repair work, which is performed gratis for the purpose of showing the broad-gaged good-will of the motor car manufacturer toward the owners of his vehicles.

The good-will element of service varies widely with different manufacturers, and even with the different dealers of the same manufacturer. It is supposed to cover a multitude of things that the manufacturer will do gratis for anyone who purchases his vehicles, and which he is under no obligation morally or otherwise to perform, but which he does or agrees to do because it will make his patrons talk of his liberality; in other words, it is good advertising.

I think it is correct to say, therefore, that "service" consists essentially of repair work and advertising.

In the absence of specific promises to his patrons, the manufacturer's obligation extends only to the point of delivering to his patrons cars or trucks of his standard of material or workmanship. There is no obligation upon him to deliver a perfect vehicle, especially since such a vehicle has probably not yet been devised. But there *is* a strong obligation upon all of us to deliver to our patrons that quality of material and workmanship which we have previously established as our standard of excellence. If a particular vehicle falls below that standard, we must make good without expense, if the flaw develops and is brought to our attention within a reasonable time.

Beyond this point, we are under no moral obligation, and what we may do additional constitutes the advertising element of service. Up to the point where moral obligation ends and service for advertising purposes begins, there should be little difference of opinion among us. But when we enter the good-will or advertising element we vary widely in promise and performance. Is there any common ground which it is advisable for all manufacturers to assume and to stand upon, assuming it to be true, as I believe it is, that every one of us is quite willing to go the full length of his moral obligation?

Assuming that we have delivered to an owner a vehicle fully up to our standard, the amount of service he is satisfied with depends in general, wholly upon what he has been led to expect. You well know, from experience that your dealer who *promises* the most to his owners is not necessarily the dealer who has the most satisfied owners. It is not even true that the dealer who actually *does* the most for his patrons is the one who has the most satisfied owners. The fact seems clearly to be that that dealer has the greatest proportion of pleased users who, at the time of making his sales, explicitly and carefully makes it unmistakably known to his patrons exactly what they will receive in the way of free service, and just what they will be charged for, and who thereafter promptly and efficiently makes good his promises, even though they are definitely limited in scope.

It is a truism that cannot be denied that in the long run patrons are better satisfied to pay a fair price for service work, if it is done immediately the need develops, and if it is thoroughly well done at the first effort, than with careless, slipshod repair work for which no charge is made.

No other branch of industry with which I am familiar gives, as a general proposition, so much in the way of free service as our own automobile business. The existence of this liberality of free service is undoubtedly due to the fact that as soon as that automobile business was born, scores of manufacturers took it up simultaneously, and from the very outset there was the very keenest competition, which patrons availed themselves of to extract from motor car manufacturers most lavish promises, either expressed or implied, as to what would be done for them without charge. In nearly every other line of business, history shows usually some one pioneer who developed it to the point of success, and who established precedents as to repair work and service before he had serious competition, and, under these circumstances, the pioneer manufacturer did not make extravagant promises of free service, and later manufacturers who came into his field usually fell in with the precedents he had established.

What kind of service is promised you when you buy a yacht, or a gun, or a locomotive, an installation for your power plant, machine tools, an elevator, or what not? In all of these lines we expect the manufacturer to make good if he sells us an article that is below his established standard of excellence. Also, we know perfectly well that if we ask him to do anything more, we shall expect to pay the bill for time and materials, and a reasonable profit. Custom has educated us what to expect, and we accept the result without any feeling, but that it is only fair and right to pay the bill. The public generally is willing to pay what it thinks is fair, but what it thinks is fair depends entirely upon its education, and I feel that we have all failed in our duty towards our patrons and our dealers in not educating them as to what is fair and economically possible in the way of service.

The public naturally will take all the free service it can get, and whatever is given is accepted as a matter of right. Some dealers in an excess of zeal, arranged to give a day-and-night service, whereby if a truck were incapacitated during the day's business, it could be repaired over night and ready for use again in the morning. The public was perfectly willing to accept that service without thinking very much about it, and without properly appreciating it. But the dealers found that it was impossible to meet expenses with a 24-hour service, or to secure thoroughly competent repair men who would work in a night shift month in and month out. So the dealers have, in every case so far as I know, been obliged to give up the night service. And then you may be sure a howl went up from the public, who, from having the privilege of night service, came quickly to esteem it an unalienable right. The owners had been educated in the wrong direction. So long as they had never been given night service, they arranged their affairs so as to get along without it.

Now, there is no denying the value of night service to truck owners. So would a Sunday service be valuable to them, but there are practical limitations that ordinarily prevent a satisfactory service except during the usual time of business.

I cite this merely to illustrate the degree to which satisfactory service depends upon how an owner has been educated. The same principle applies to almost everything we are asked to do for him.

Some of the troubles connected with service grow out of the difficulty of maintaining uniformity in the various dealers' establishments and among the various manufacturers. The case is found frequently in every city, where a new dealer locates and starts in to create a clientele. In order to quickly secure a following, he makes large promises as to the liberality of his service, and for a time at any rate, he does give more than other established dealers can afford to give. He does this, of course, by way of advertising solely, and ultimately he falls back more or less to the level of the other established dealers in his town.

But, in the meanwhile, the pressure is very strong upon the established dealers to meet the attractive service conditions dangled before the public eye by the newcomer. Most dealers fall for it rather than risk losing their customers. So temporarily, in that town, a new standard of service is established, which cannot be permanent because the margins of the business will not allow it.

It takes education along the broadest lines, repeated and reiterated, to hold dealers level when these not unusual conditions present themselves. It takes valuable time to resist the demands of a shrewd owner, who is bent upon getting something for nothing, or something that wouldn't be given his neighbor. But, in the long run, it pays well to sit down with him and reason him out of his unfair demands, or failing that, to refuse them point blank, because, after all, an owner doesn't appreciate a concession that he extorts, and when he comes back to the dealer a second time, he will have the same concession or a better one, or he will take his patronage elsewhere.

Education is what is badly needed,—education along broad lines of fair and uniform dealing, untainted by influence or pressure.

Now, we have sincerely endeavored to work out our service problems along the right lines I have described. At the beginning of our business existence, we were very liberal indeed. I could cite you many instances of free repairs after 3 or 4 years' use of the car, but gradually it

became borne in upon us that what was given for nothing was not appreciated, and only whetted the appetite for more. The gratuitous element of service work in a large measure lost its advertising value because many others promised a great deal more than we could possibly perform. The second-hand trading problem loomed large on the horizon, margins narrowed, and we realized that it was time to reform our service policy upon a business basis, under which we would fully and completely discharge all of our moral obligations to our patrons, and even go somewhat beyond that for good measure, but also, on the other hand, to definitely limit the gratis work expected of us.

The basis of our new policy was a complete, thorough advance understanding with our owners as to just what we would and would not do. We have not restricted our written service policy over what, it was before. As a matter of fact, we have enlarged it. The essential difference is that we have cut out indefiniteness by a clear, concise definition of what we will do gratis and what we will charge for. And the new policy we have proven will, if firmly adhered to, hold all our friends, and, at the same time, put our service departments on the right side of the ledger.

We finally arrived at a service policy for cars and a separate one for trucks, because we found that the conditions were so varying that, while the same principles apply to both, the details should be different. Both policies are alike in that they are based upon *assisting* owners of Packard vehicles to keep their vehicles in best operating condition, rather than assuming the *responsibility* for so doing. Nine-tenths of that is, and must be, upon the owner and his drivers. And it can be placed there, too, if our dealers have a just, clean-cut service policy, and stand by it.

As this is a convention of truck manufacturers, I will confine myself to our Truck Service Policy. This consists of two parts,—the warranty of the Packard Motor Car Company and, supplementing it, the Dealers' Service Policy.

The Packard warranty is not essentially different from the standard warranty adopted by the National Automobile Chamber of Commerce. It is our Dealers' Service Policy that is new.

Under the dealers' policy, provision is made for giving the owner absolutely first-class service, no matter what happens to his truck. If he provides himself with competent drivers, or if he will arrange to have his vehicles delivered to the dealer's establishment, service should cost him nothing all during the first year, in the absence of accidents. But if, for any reason, he insists upon inspection being made away from the dealer's service department, then he has to pay a very reasonable sum for the luxury.

The underlying idea is that we provide the facilities enabling the owner to get a year's service at no cost, but if he will not bring his vehicles to the dealer's establishment, then he must pay according to the distance the dealer has to send his inspector. The essential particulars of our Dealers' Service Policy can be summarized as follows:

(a) For one year, the dealer will inspect monthly the trucks he has sold, and make minor adjustments gratis, if the truck is delivered for attention to his service department.

(b) If not delivered to him, and he is obliged to send a workman to wherever the truck may be located, he will inspect and adjust monthly for a year, doing whatever work can be completed within 3 hours at each visit, for a schedule of charges as follows:

Within a 10 mile radius	$1.50
Within a 20 mile radius	2.50
Within a 30 mile radius	3.00

Beyond 30 miles, a special arrangement is to be made based upon the distance the workman has to travel.

(c) The dealer will make all adjustments as often as the owner may desire within the first month after delivery, if the truck is brought to him. After that, the dealer charges his standard rates, except for monthly inspection at his service station, and except that during the first 90 days after delivery he will replace, gratis, parts that may be furnished without charge by the Packard Company. All gratis work is to be done at the dealer's service station. If a workman has to be sent out to replace the free parts, a charge is made to cover any expenses of the workman.

(d) If the truck is delivered within 100 miles of the dealer's store, an instructor will be supplied gratis for a period of 3 days, which is believed to be sufficient time in which to break in the driver and teach him to handle the truck properly.

(e) After each inspection the dealer sends to the owner of the truck and to the Packard Company a report covering the results of the inspection, which show not only what was done by the inspector, but also the condition in which he found the vehicle, together with any evidences of neglect or abuse.

Our dealers who are making the most satisfactory and successful use of this new policy are, of course, those who enforce it tactfully but firmly. They print it upon the back of their order forms and upon all invoices rendered to their patrons for work done, whether the work be gratis or charged for. In this way, from the very beginning of their relations with the owner, the latter buys the truck knowing exactly what he will and will not have to pay for.

We have not forced this service policy upon our dealers. We worked it out with their assistance, and they adopted it, for the most part enthusiastically, as being an arrangement that offered the owner all possible facilities for having his truck properly taken care of, if he would avail himself of them *in the way most economical to the dealer.* But if, on the other hand, the owner requires special service then he has to pay for it a sufficient amount to give the dealer a chance to live.

Can manufacturers adopt a standard service policy? Of course, they can, but they won't probably until the absolute necessity is brought home to them through the financial showing of their dealers. It will come in time as a matter of self-preservation. I hope it will come soon, because the margin of profit from the manufacture and sale of gasoline vehicles is narrowing rapidly under the intensive competition.

I believe all of our members are ready to adopt a standard service policy as soon as they are shown one that is in successful operation and which is fair to owners and possible of being carried out by the dealers. Our experience with our new dealers' policy indicates that we have taken a long step in advance. It is showing excellent results, and after 6 months' experience with it, we have not found that we want to change it. I don't mean that we have had no trouble in introducing it. Any change brings complications, but the difficulties have not been serious, and the policy has been successful in every case where the dealer has really tried to establish it.

WHAT CAN BE DONE TO IMPROVE CONDITIONS IN THE MOTOR-TRUCK BUSINESS?

By JOHN W. VAN ALLEN, Atterbury Motor Truck Company

I DO not assume extraordinary or unusual qualifications in expressing opinions on the manufacture and marketing of motor trucks. I profess only the ordinary business knowledge acquired by experience as an officer in various manufacturing companies, of which a truck company is one, and also as the legal representative of many industrial corporations engaged in various lines. The many diversified problems with which I have had to deal in these capacities have impressed upon me certain convictions relating to the principles, conditions and practices in the manufacture and sale of motor trucks, and you are welcome to them for such benefits as you may receive therefrom. I hope that they will do no one harm.

We are living in a rapid and revolutionary age. Time-honored traditions have been swept away and new practices have taken their places to an extent not fully appreciated, even by those who have been most deeply concerned in them.

We have been in the past a careless, prodigal and unscientific people in our methods of manufacture and marketing our products. However, no one alert to the situation can have failed, in recent years, to notice the many able and instructive articles appearing in magazines and trade journals, treating the problems of proper management of business, not only in producing goods, but in advertising and selling them.

While this process of business instruction has been going on, there has also been a very noticeable renewal of activity in discussions among business men, privately and in conventions, assemblies and conferences of those engaged in similar lines and having similar problems to meet.

A few years ago a competitor was an impossible person who must be held at arm's length, while to-day these conferences have more of the appearance of a gathering of business associates for the discussion of vital problems affecting the industry.

In the month of September last, invitations were extended for a conference of motor truck manufacturers, dealers and those engaged in kindred lines and in the month of October in response to that invitation some 300 representatives met and discussed matters of interest to the entire industry.

That the men engaged in this industry felt the need of such a conference is evidenced by the number who attended; and the character of the problems needing careful consideration is shown by the questions considered.

Here are some of the topics discussed at that conference:

1. Time payment plans for motor trucks.
2. Territorial lines for dealers.
3. Evils of overloading and over-rating trucks and permissible body weights.
4. Demonstrations — necessity and charges.
5. Reforms needed in merchandising motor trucks.
6. Manufacturer's guarantee and service to owners.

As a result of this conference, an immediate need of an endeavor to co-ordinate

The CCJ has most readers because it gives most information

in some way the great number of manufacturers engaged in the motor truck industry became apparent to those who had participated in it. The problem then became as to whether this co-ordination and co-operation should take place by joining (1) an existing organization covering both pleasure and commercial vehicles, or (2) an existing organization embracing motor truck manufacturers, dealers, users and the like, or (3) forming a new organization; or (4) holding stated conferences from time to time to which all truck manufacturers should be invited, without a general organization. This problem is not settled.

We must remember that concerns engaged in this business are easier separable into classes, but that there are certain vital principles affecting the whole community of interests.

We boast that the United States is a free country, and that opportunities are alike for all, but I sometimes think that we pay tremendous penalities for this freedom, particularly the freedom with which without adequate capital, without experience, and without credit strength any man or group of men may engage in a business requiring large capital, large experience and credit strength, and do tremendous damage, while they exist without gaining any advantage for themselves or their stockholders or the purchasers of their products, and certainly not for their creditors, who are left to mourn over the inadequate remains.

There are serious difficulties to be encountered in connection with each suggestion, but the fact remains, in my opinion, that no plan can be successful except one which permits all engaged in the business to come in and participate, in order that those who most need to be taught the lesson of trade abuses, and who most need the steadying hand of their stronger brothers, may not stumble by the wayside, to the great detriment of the industry as a whole.

I have implied that trade abuses exist—it is a matter of common knowledge to you—and the suggestion has been made that the fatal results which follow the practice of them should be continually emphasized by a process of instruction carried on through the medium of one of the four ways indicated in this paper.

Having thus publicly stated to you these things, it would perhaps be unreasonable and savor of lack of courage or insincerity unless at the same time a frank statement is given of the things which, in our opinion, constitute trade abuses that should be remedied. To the best of my ability, therefore, I will endeavor to outline some of the practices which from a more or less outside standpoint have impressed me as unbusinesslike, inviting disaster and the perilous waste of the resources of the financial interests supporting manufacturers and dealers, without satisfactory results to customers, and so unscientific as to discredit the stability and business judgment of those engaged in it, and lowering the standard of the industry.

Long-Time Payments

There have been certain strong companies doing a national and sometimes an international business, who have, with their wide facilities and tremendous organization; found it advisable, and doubtless profitable, to sell their product in partial payments extending to 16 months, and sometimes more. These companies are credited with a large working capital and with a sufficiently extensive and competent organization to handle the tremendous detail involved in:

1. Passing upon the credit of the purchaser.
2. Approving, as to substance and legality, the chattel mortgages, conditional sale contracts or leases, applicable in the different States of the Union.
3. Securing adequate fire and liability insurance.
4. Keeping track of dates of maturity, renewals, interest, etc.
5. Time and method and expense incidental to the enforcement of the manufacturer's claim against delinquent debtors.

These matters of detail are expensive and accompanied by many risks and some losses, and compensation therefor must come either from the increased selling price of the product or a lessening of the cost of manufacture by reason of the volume of the business done.

There are a great many concerns engaged either in the complete manufacture or assembling of commercial motor cars, and very few of this number have the necessary working capital, the organization, or the volume to sell their product on a partial payment basis. Some of them, however, either from the habit of imitation, miscalculation, inexperienced judgment, poor judgment, or ignorance, are endeavoring to meet the competition of large companies by giving equal terms in partial payments, with the result in some cases of the gradual extinction of cash capital and of increased debts, largely contingent, but nevertheless a real menace.

In a certain other well-known line of business not connected with the automobile industry, this depletion of cash capital by these practices was met a few years ago by the sale of accounts, accompanied by warranty and ruinous discounts, and this condition became so general that in the year 1914 no line of manufacture showed so many failures, and for large amounts. It is significant to us in the truck business, or should be, that the concerns in the line of industry mentioned who failed, and failed ignominiously, were those engaged in selling their product in partial long-time payments.

There is room enough in this country for the large and the small manufacturer, each filling its particular field, and all of the methods of the large cannot be followed with safety by the smaller companies. I have no doubt that many of the large companies, selling by installments, could well profit by the excellent business judgment of the smaller ones in selling for cash, and perhaps in other ways.

If we are to draw any lessons from experience in other vocations, we will find no comfort in the sale of an expensive and movable product by long-term payments.

Employment

One of the decidedly helpful ways in which men engaged in the same line of industry may assist one another and prevent imposition, is by a frank request for information and frank reply as to qualifications, salary and the like, when an application is made for employment by a man looking for a substantial position.

For some reason, perhaps natural on account of its sudden rise, our line of industry seems to have attracted to it many adventurers with no lasting qualities, but exceedingly glib in setting forth the great results obtained in their work for other companies. Our unfortunate experiences in accepting these representations at par undoubtedly have taught us by this time to discount them heavily, but nevertheless many manufacturers would undoubtedly save much money and avoid many unpleasant experiences should such an exchange be universally adopted.

Dignity in Merchandising

There has become prevalent among business men, many of whom are prospective purchasers of motor trucks, a decided distaste to a conference with a salesman in which a major part of the time is consumed in condemning the product of a competitor, a practice commonly known as "knocking." Not only does this practice result in harm to the men engaged in it, as well as to their company, but also to all manufacturers of trucks, for things of this nature have a strong tendency to belittle the industry and create the impression that the men engaged in it as a whole are not modern, and instead of creating a general sentiment that all makes of trucks have their good qualities, the opposite idea is driven into their minds.

Were this practice of knocking universal, prospective customers would have a right to believe, if they relied upon the words of the salesman at all, that 99 per cent. of the trucks manufactured in this country were worthless; and should the condemnation extend to the individuals constituting their competitors, 99 per cent. of the men engaged in the business, it might be believed, are nothing less than imposters.

For the sake of the good name of the business, therefore, dignity in merchandising should be continually spread broadcast by those who ought to sustain it on the lines of good business policy as well as of principle.

Improvements

There are many other things concerning the business of motor truck manufacture and merchandising which are capable of vast improvement.

Many of the younger companies are managed by men not thoroughly conversant with the motor truck business, and who, lacking wide general experience in other lines of industries, fail to appreciate that the margin of profit in this industry is comparatively small, and also fail to appreciate how much of a factor of safety should be provided above actual cost of manufacture, selling and administration to provide for the contingent obligations which many of them assume.

There is a limit beyond which no manufacturer should go in the matter of guarantee, who is selling a product such as trucks, where improper operation could very easily result either in a serious controversy with the customer or the payment by a manufacturer of heavy sums under too broad or too long a guarantee. Experienced men are able to advise us as to the length of time which ordinary conditions would require to develop improper material used in manufacture. What this limit is can best be determined by the technical man in the business. To me it has always seemed that 3 months would be ample. If a longer time is given, almost invariably it seems that the manufacturer is compelled to make good to save the good-will of the customer, whether it is the fault of the product or not.

There is another class of manufacturers who, believing that service is the best kind of advertising—and no one disputes this—have been led into extravagant expenses. Once this practice is established by a company, the small items begin to run into large figures, and this, with other things, reduces the factor of safety and the possibility of profit.

There is another practice more or less prevalent, and perhaps the most difficult of

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any to control, and that is selling at less than list prices, either by special discounts, ridiculous allowances for old trucks, or the giving of agents discounts where no bona fide agency exists or is intended to be created. This practice may and does in some cases result in sales, but in nearly all such cases both the customer and the manufacturer are in danger of losing their self-respect, one because of his taking something which does not belong to him and to which he is not entitled, and the other by giving away something that belongs to the stockholders of his company.

I do not mean to say that special circumstances do not exist whereby old-time customers are not entitled to special consideration, where their demands have always been reasonable and where business dealings have been so satisfactory that a reasonable profit would still be left for the manufacturer. I am only endeavoring to emphasize the dangers attending such practices and in no way attempting to pass upon concrete instances, which must be settled according to circumstances.

Co-operation

I am convinced that it is the business principles of the industry that need attention at the present time, and that many things might be done to improve them, such as co-operation among manufacturers; elimination of long-time payments; long, extravagant guarantees; knocking among salesmen; price cutting; too liberal service policy and the like, and I repeat again what I said in the beginning, that there is immediate need of an organization or of regular conferences where all engaged in truck manufacture are welcome and invited, so that not only good business policies and good practices may prevail, but that the technical man may likewise exchange ideas for the betterment of the product, thus contributing to the general improvement and to the dignity of the business in which we are engaged.

We need to conserve our resources. We need to secure greater confidence by bankers in the motor truck business. We need to educate the general public to the advantages in the use of commercial cars. We need to scrutinize legislation inimical to the user of such cars as well as to the manufacturer. We need combined action to curb high financing in order to obtain and preserve the confidence of those who invest in our stocks and securities, or loan us money or give us credit. We need to inculcate in the minds of every one connected with the industry that the same business principles which prevail in other lines must prevail in this one, if the business is to endure. We need an organization that will teach these things, and promote them, and we need to know each other better that we may acquire a broader knowledge and broader experience in the things which pertain to motor truck manufacturing and merchandising.

CAN THE DEALER MAKE MONEY SELLING TRUCKS, AND IF NOT, WHAT IS HIS FUNCTION?

By Robert O. Patten, Truck Sales Manager
Pierce-Arrow Motor Car Company

AMONG the greatest problems now confronting the manufacturer of motor trucks is the sale of these trucks to the consumer and then properly looking after them so that they will give the satisfaction which may reasonably be expected. Apparently there is great unrest and question as to the best method to accomplish these two objects. Some manufacturers feel from factor-to-consumer the proper course to pursue, others the branch house, and a third, the dealer; and the equation is being attempted through these three channels.

The author of this paper, having his experience with the dealer method, is of the opinion that this is the most satisfactory channel through which to sell trucks, provided the maker is willing to study the practical problems which confront the dealer, co-operate with the dealer in working out his troubles and, above all, educate him how to sell trucks—and what is equally important, assist the user in working out his troubles.

But ask the average automobile dealer what his experience has been in handling trucks, and the answer in the majority of cases will be one expressing dissatisfaction with the business in all its phases. The main reason for this is the fact that the dealer is usually an automobile man, has felt those qualifications fitted him to sell trucks and has never appreciated the true necessities for success in the truck business.

The automobile dealer, when he accepted a truck agency, did not realize he was entering into a distinctly different field of endeavor. His selling methods of ease of riding, silence, beautiful body lines and casual demonstrations were all upset. He found he was no longer dealing with those who had but a vague idea of motor car construction, but on the other hand he was confronted with business organizations who in the main were successful, and that he had to convince more than one individual before the sale of a truck was made. Comparing the sale of passenger vehicles and trucks, the latter seemed to be drudgery, and dealers were disappointed over the slow progress they were able to make.

Unfortunately in many instances the sale of trucks from manufacturer to dealer, and from dealer to user has been a case of the blind leading the blind. The manufacturer has led the dealer to believe many things, and the dealer in turn has, with good intention, passed the misinformation along to the customer, with the result that all these parties, as time goes on, realize that a bad relation has been established. This one point can best be emphasized under the topic of overloading. The maker tells the dealer how strong and rugged is his chassis; how the engineers have provided for safety factors in the vital working parts, and intimates the ability of the truck to carry over its rated capacity. All of this is simply an invitation for the dealer to sell the user a truck with the understanding that it may without injury be considerably overloaded. We all know the outcome of transactions of this kind, which fortunately are becoming less and less, but past instances have caused great damage and loss to the industry. It takes moral courage to turn down a sale, but many times it is the wise course to pursue, and the dealer will all the more appreciate his factory connection if you tell him good reasons why not to make a sale.

Dealers will tell you the truck business is unprofitable because it cost too much for service. If it does, it is largely the dealer's own fault. Motor trucks to-day are supposed to be sold by the manufacturer on a standard ninety-day warranty. If the maker will insist upon the dealer having his warranty contract with the user on this basis, much expense and trouble can be avoided. The dealer, however, seems to feel it incumbent upon himself to extend the guarantee in both terms and time, feeling that otherwise he would lose business. In case of trouble, the dealer advises the factory of the point in question being a special one, requests extraordinary consideration and the factory in turn, rather than quarrel with the dealer, unintentionally becomes a violator of its own contract of warranty. The bars are down and now the line of demarcation between service and imposition is so fine drawn it can hardly be observed.

The condition of affairs can be avoided if the dealer will stand hard and fast to his factory instructions on warranty. When a dealer makes concessions in terms of purchase he is admitting that the buyer is a better business man than himself, and he is no longer a salesman, but is simply an order taker who accepts what is handed to him. No dealer to-day gets any credit from truck buyers for trying to give away his profits and service, and few if any orders are actually lost because the buyer cannot have his wishes carried out in every respect.

Unfortunately for the buying public and the dealer, too, there has been too little educational matter placed in the hands of the dealer by the factory. The sales manager has demanded sales from the dealers, but he neglects to place in the dealers' hands the proper ammunition out of which sales can be created. In place of good, intelligent reading matter as to what a truck may or may not be expected to do, there is too much bombastic talk about efficiency, transportation engineering, fourth fractional figures, and other theories. The advertising manager at the factory in his copy invites the public at large to have their transportation looked into free of charge. Like the patent medicine remedy, if the motor truck does not cure all hauling evils, your money back and no charges. This sort of thing has been overdone. The dealer knows it is simply bait to create prospects for him, and in the large percentage of cases if he were asked to analyze an important transportation installation he would be scared stiff and certainly would not or could not afford to do it free of charge. Nor can any dealer be expected to entirely reform, after casual investigation, what it has taken the establishment years to build up. He can only offer his wares for sale, make his recommendation, and allow the buyer to make the choice that their experience dictates will fit the business.

More satisfactory progress in point of sales could be made by dealers if they would concentrate in trying to sell trucks upon the fact that the motor truck is a time and distance saver; point out the adoption of motor trucks by the large industrial concerns and a similar line of selling talk. It is a positive fact that only those who have made a most careful study of costs are qualified to discuss that angle of transportation. The average dealer, if he attempts a discussion of cost figures, will usually either confuse the buyer or, if the buyer is well posted, confuse himself. In the main, I do not recommend a discussion of costs by the dealer. There are too many other attractive points in favor of motor trucks without injecting a rather dangerous and misleading topic, which takes an expert to handle intelligently.

The dealer needs information that he can pass along to his customer. This information if of the right sort is educational and is going to help the industry more than anything else, because the dealer will tell the truth to the buyer and there

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won't be any misunderstanding later on. Manufacturers should not be afraid of placing confidence in the dealer, because the interests are mutual, and if the dealer gets into trouble, the manufacturer sooner or later will in that territory ride in the same boat.

On account of the author having heard so many misstatements made through pure ignorance, by both branch house salesmen and dealers, he desires to emphasize the plea that manufacturers give their selling connections honestly and frankly essential information, such as how much a chassis weighs; how many miles it runs to the gallon of gasoline and oil; the actual rated horsepower; the speed of the truck and other points vital to the buyer. Unless your selling connections have these facts from you, they won't say they don't know. They will guess, and if they don't guess correctly, then the buyer has to find it out himself, and he will feel he has been deceived.

The over-anxiety of the dealer to make sales—an enthusiasm shared by many factory sales managers—has proven his undoing. There is a demand for the motor truck, but this can never be normally increased by price concessions, ridiculous long-term payments, trading obsolete equipment or abuses of that sort.

Utopian fields are not to be reached via the motor truck. Great advances have been made the past 5 years in the right direction, but there still remains great room for improvement. Conservatism should be the keynote—ultra conservatism on the part of the maker with the dealer in order that all dealings may be on a sound commercial basis. Sales may not be so rapid, but they will be more profitable sales that will bring repeat orders and a host of friends. Dealers who have been unsuccessful with trucks and are discouraged are not themselves entirely to blame. Great responsibility rests with their factory connection upon whose judgment they have relied and failed.

In the main the dealers who handle trucks also sell passenger vehicles, and one of the gravest errors made has been the attempt to handle both lines in the same manner. The truck business must be a department in itself. It must have a department manager, salesman and emergency men, who handle trucks and trucks alone.

It is a real man's job to sell motor trucks to-day, and anyone who hopes to make a success of it cannot straddle the fence and divide his time between trucks and touring cars. At the expense of repetition, dealers departmentize your truck business and your car business; otherwise you will have a failure in both.

The author of this paper believes the function of a dealer may be quite as satisfactory as that of a branch house in handling commercial cars. It has been asserted that branch houses can be more directly handled by the factory on account of ownership, and that while a branch house may be instructed to take certain action, they may assume only the form of a suggestion to a dealer. The answer to this supposed condition is that any live dealer will listen and accept the judgment of the factory if the suggestion is a good one—and the factory will not make bad suggestions intentionally whether to branch house or dealer. In case of a dealer or branch house, the effort to attain the same results prevails, and while a factory having a proprietary interest may dictate to any extent, the privilege of enjoying a disciplining power is more than offset by getting from the dealer his greatest effort, which he gives because the profit he makes is his own.

CAN STANDARD LOAD RATINGS BE DEVISED AND APPROVED BY TRUCK MANUFACTURERS?

By H. Kerr Thomas, Assistant Manager, Pierce-Arrow Motor Car Co.

IN order to answer the above question, it may perhaps be of interest to the meeting to learn what my own practice has been in this respect. Reports are so constantly current as to the satisfactory or unsatisfactory showing made by any given truck in competition with some other, that taking advantage of a convention of truck salesmen from the various branches of the Pierce-Arrow Motor Car Company, about a year ago, I improved the occasion to place in their hands a method of analyzing the design of a truck from the user's point of view, to enable a just criticism of its performance to be made.

Before giving you the details of this, it may be as well to state that the suitability of a truck for a certain load may be viewed from two standpoints.

First—The possibility of carrying a certain load upon a truck without causing it to break down as a whole or in parts.

Second—The proper selection, proportioning and location of the various units of the chassis to carry a definite load with a maximum of economy.

One need not say that the latter is by far the more important of the two. What is of far greater, and indeed the only real interest to the truck user, is to know when he buys a truck that the various parts of it are selected and proportioned in accordance with recognized good practice, and that he will be able to use the truck, assuming proper attention is paid to its upkeep, with certainty of real financial advantage to himself.

Taking the broadest view of the situation, he requires to transport some thousands of pounds over a road, and wants to know that he is providing himself with a motor of a suitable capacity to do this work, neither too large nor too small, and although perhaps he does not know it, it is very desirable that he should be informed as to the gear ratios of this truck so that he may be able to determine its hill climbing capacity.

The marketing of a truck physically unsuited to the load which will be placed upon it, brings such swift and certain retribution that no one would be able to pursue such a policy for any length of time. For this reason, it seems to me that it is unnecessary to attempt to specify certain strengths for various parts, let us say the frame, or the axles, because the designer has the command of so wide a range of materials that it is quite possible to adopt almost any proportions provided suitable materials be selected. The statement that a driving axle is of a certain diameter or that a frame is of a certain section conveys no meaning unless the strength of the respective materials employed is also stated.

To attempt to control the policy of the manufacturer or designer of a truck in this respect, would be undesirable and ineffective.

I make this statement unreservedly—the standardization of detail dimensions of trucks is wrong because it is impossible. I will give you an illustration of this from the analogy of a structure with which everyone is familiar. Suppose we have to carry a roadway across a river a hundred feet wide, by means of a single span arch. We have a choice of four methods:

(a) Stone blocks with an arch perhaps six feet thick.
(b) Reinforced concrete with a composite arch three feet thick.
(c) A steel latticed girder perhaps six feet deep, but very narrow and light.
(d) Lastly, a suspension bridge with an inverted arch of only six inch thickness, made of steel wire of exceedingly high tensile strength.

We know from actual experience that either construction would be equally satisfactory, and it will be absurd to attempt to to standardize the thickness of the arch because a clever engineer by employing suitable materials could make a satisfactory arch of whatever thickness he pleased.

Now apply this analogy to say the live axles of a gear driven truck. It can be shown that if steel having an elastic limit of 80,000 lbs. be used, a 2-inch diameter shaft will stand without injury, a twisting moment of 125,680 inch pounds. You would be correct in saying that a truck of a certain capacity should have 2-in. drive shafts. In my own practice, I employ, however, for the drive shafts, a special steel having an elastic limit of 175,000 lbs. per square inch. It is, therefore, only necessary to employ a shaft of 1 9/16-in. diameter to do the same work just as well. For obvious reasons, you could not go to manufacturers and specify the quality of steel they must use. Consequently, you cannot go to the user and say for a truck of such a capacity your axles must be of a certain size.

Again, we know that a solid rubber tire to-day requires to be of such dimensions that it is not loaded beyond 2.5 to 3 lbs. per cubic inch of rubber. We do not know, however, that some tire maker will not produce to-morrow a rubber compound which will stand a much greater load, and to expressly state that a solid tire must contain a definite volume of rubber is to penalize the ingenuity of the maker, and consequently to arrest progress.

Such, then, are the reasons which have led me to disregard any standardization which limits either dimensions, form or material, and since basic principles require no standardization, being themselves unchangeable, it has been my endeavor to develop a rating formula on first principles which will be applicable to anything that may be ultimately put on the market.

Before describing the proposed formula, it will be as well to attempt to deal with the probable criticisms to which it is liable.

First, it may be objected that in the formula I shall submit to you, no mention has been made of the speed of the vehicle or the revolutions of the motor. As a matter of fact, both are accounted for as the gear ratio is introduced in the equation.

The value of the co-efficient of road friction varies enormously, say from 20 to 300 lbs. per ton of weight. It is, therefore, impossible to theorize as to what power is necessary to overcome this. Custom, however, has established a useful working relationship, between the weight and the horsepower. Above this proper relationship gasoline consumption becomes excessive; below it, the vehicle cannot travel through bad ground. It is, as always, a case of compromise which may at first sight seem an arbitrary one, and has been arrived at through the long and uncertain process of experience by many manufacturers.

We can, therefore, be certain that to move a vehicle of a thousand pounds weight through a given distance, involves an expenditure of power which in practice averages a known and constant figure.

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This power may be expressed as work done in foot pounds, which have an equivalent value in heat units, these being supplied by the combustion of a definite quantity of gasoline. To burn this gasoline requires a motor of a certain capacity, and since all modern motors have commercially, a volumetric efficiency of 60 to 65 per cent., we really are led back to the dimensions of the motor and its speed, its breathing capacity as we may term it, as the unit of measurement of its *capacity*, in proportion to the unit *weight*, moved through a unit *distance*. We may thus have a small motor turning over fast with a large gear reduction, or we may have a large motor revolving comparatively slowly with a small gear reduction, and the result will be the same.

It is apparent that there must be a definite relation between the size of the motor, the gear ratio and the total weight of the vehicle, and it is an easy matter to combine these between the size of the motor, the gear ratio and the total weight of the vehicle, and we can state them in a simple expression which will give us a co-efficient of correct design. It is self-evident that a motor of a certain size must be necessary to haul an automobile under average conditions, and the size of the motor can be most easily expressed, and at the same time made to include the proportions of the gear ratio, by stating its dimensions in terms of the weight moved through a certain distance.

Calling this co-efficient Q, we may write an equation as follows:

$$Q = \frac{\frac{11}{4} d^2 s n r}{D \times \frac{11}{12} \times W}$$

Where d is the cylinder diameter in inches.

s is the stroke.
n, the number of cylinders.
r, the total gear ratio.
D is the diameter of the wheel in inches.
W, the gross weight of the vehicle with its load, expressed for convenience, in thousands of pounds.

This simplified into the following equation:

$$Q = \frac{3 d^2 s n r}{D W}$$

The value of Q, therefore, is the number of cubic inches of cylinder volume per 1000 lbs. moved 1 ft.

Before going further, it may be mentioned that for a pleasure car, Q has an average value of 30 to 35, while for a truck, the figure varies from 15 to 20, in both cases the calculations being made on the highest or top gear of the vehicle. As an example, I have worked out the average value of this co-efficient Q for nine high-grade trucks of different makes and sizes. Bear in mind, please, that the size of the truck has nothing whatever to do with with the value of Q.

First speed, 72.5 cu. in. per 1000 lbs. moved 1 ft.

Second speed, 37.3 cu. in. per 1000 lbs. moved 1 ft.

Third speed, 26.3 cu. in. per 1000 lbs. moved 1 ft.

Fourth speed, 17.6 cu. in. per 1000 lbs. moved 1 ft.

These figures are, of course, arbitrary, but it will be found that they are in accordance with good and sound practice. For specially hilly districts, the first speed of a truck should have a Q value of about 80, and a top speed value of 16 to 17 for use in flat country on good roads is also good practice. The intermediate speeds must be left to the discretion of the designer, as there are reasons for certain progressions which I need not go into here and which would not interest the public.

If then, we agree that 17.5 is a correct mean value for Q for any truck on high gear, we can by substitution write another equation which will give us the value of W, which it will be remembered is in thousands of pounds gross weight of vehicles, body and load, thus:

$$W = \frac{3 d^2 s n r}{17.5 D}$$

and this formula is accurate.

We know, however, in practice that the driving wheels of trucks vary from 36 in. to 40 in. in diameter, and the mean of this, 38 in., is consequently accurate within 5 per cent. for any truck, and it is probable that this approximates sufficiently to the requirements of the public. If, therefore, we substitute this number for D in the last equation, we get

$$W = \frac{3 d^2 s n r}{17.5 \times 38} = .00464\ d^2 s n r$$

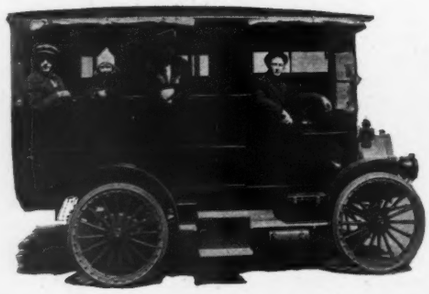
But we have agreed that W is in thousands of pounds. Therefore, if W is to be expressed in pounds, the equation becomes

$$W = 4 d^2 s n r$$

If the weight of the paying load be deducted from the gross weight, and the body weight allowances recommended by the National Automobile Chamber of Commerce be deducted from the remainder, the result is the weight of the chassis; and such a weight, it will be found, agrees with the average chassis weight adopted by the leading manufacturers of this country.

In my own practice, I have found this to cover practically the whole of the rating question for trucks of whatever size and without giving any mathematical reasons, I can assure you that the numerical examples I have given you are in accordance with the practices obtaining in vehicles which are absolutely satisfactory in every way.

It would seem to me, therefore, that the formula given provides a means of rating which should be adopted and declared by every truck manufacturer in his own interests and in those of the users.



Internationl Model E Chassis Fitted With Jitney Body

This outfit is owned by L. Houts, of Omaha, Neb., and was built by the International Harvester Company of America, Chicago. Three of these trucks are in operation in Omaha and are giving excellent service. The entrance at the right side just back of the driver's seat makes it convenient to enter the car from walks or crossings, and is handy for collecting fares.

FIRST COST NOT THE MAIN CONSIDERATION

By A Truck Salesman

The manager of a branch of the Commercial Truck Company of America when asked for the secret of how to sell the highest priced electric said:

"The man who asks without flinching for a 1000-word analysis of how to sell the highest priced electric trucks made in this country ought to be in Germany telling the Kaiser how to run the war; why waste it on a truck salesman?

"If the writer had a formula he would be busy applying it instead of writing this. No two sales are made in the same way, but certain principles always apply.

"Assume that the truck is all that the salesman claims, and let us see how the latter can convince the close buyer that it will pay him in the end to invest $5000 when a similar capacity truck of an equally reputable make can be bought for $4000.

"First, he must make the purchaser realize that the car for him to buy is the one whose 'first cost' plus 'total cost of operation and maintenance during its life' is lowest. He can see the thousand dollars' difference in first cost; make him consider this in its bearing on the total operating cost. Ten dollars a day to operate and maintain a five-ton electric is $3000 a year, or $30,000 in ten years, the useful life of an electric if the buyer expects to stay in business.

"Assuming for the moment that both trucks cost exactly the same to operate and maintain, then the contemplated investments (first costs plus total operating costs) are actually $35,000 and $34,000, instead of $5000 and $4000, or a difference of less than 3 per cent., instead of what appears at first sight to be a difference of 25 per cent. In other words, first cost is about 15 per cent. of the total amount which the purchaser proposes to invest. If the salesman's belief in his truck is based on knowledge and actual experience, he has a good chance of convincing the business man,—who is no fool, or else he would not have authority to buy,—that there is more than 3 per cent. difference between the costs of operating and reliability of the two trucks. If his arguments are sound, they will be substantiated by old users. This is where the salesman's ability and resourcefulness is put to the acid test.

"Realizing the difficulty of selling the first high-priced truck to a prospect, all of our salesmen are required to serve a year's apprenticeship in the factory and repair shop, where they are made thoroughly familiar with the construction and are sent out on demonstrations and tests. The result is that as salesmen they can readily size up the prospect's requirements and sell the size and type of truck and battery which will best meet these requirements. One truck properly sold generally results in more actual profit for the manufacturer than two trucks improperly sold. Business to be successful must be mutually profitable to both manufacturer and user."

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ASSOCIATION CELEBRATES YEAR'S EXISTENCE, WITH DINNER AND MINSTREL SHOW

Minstrelsy and motor trucks mingled entertainingly at 6.30 p.m. April 21st on the roof garden of the Adelphia Hotel, when the Motor Truck Association finished a winter schedule of activity by giving an old-time minstrel show.

The show itself was preceded by the regular monthly meeting and dinner of the association. W. H. Metcalf presided and the speakers included E. J. Cattell, Judge Eugene C. Bonniwell and G. Douglass Bartlett.

An audience of 250 greeted the principals when the curtain rose on the show proper. Seated around the circle were: A. E. I. Jackson, E. B. Jackson, Edward Brooks, Jr., E. C. Huhn, Dr. John C. Hirst, H. B. Armstrong, Phillip S. Russell, Dr. William P. Grady, Phillip N. Leroy, William J. Baird, Benjamin Hawley, Charles F. Griffith, G. B. Shearer, J. H. Rosen, T. M. Wright, R. K. Merrick, E. M. Bartlett, John D. Howley, and Lee J. Eastman. George M. Graham was the interlocutor. The first pair of the end men were Emlem S. Hare, and Ross Walton. Charles Grakelow and Fred Browning finished the show on the ends.

A notable chorus had been built up under the direction of E. B. Jackson, president of the association, and a half a dozen old-time minstrel choruses were rendered with a spirit, dash and precision that brought cheers from the audience.

The first part was followed by an olio, in which Phillip S. Russell told a series of entertaining stories in French-Canadian dialect. Charles E. Grakelow gave a boisterously humorous monologue; A. E. I. Jackson sang the "Two Grenadiers"; E. B. Jackson sang "The Holy Friar," and H. B. Armstrong sang a series of parodies on popular songs, hitting off

In arriving at an approximate cost of operating gasoline trucks, the following expenses should be considered:

FIXED CHARGES (Based on 365 days of year)

DEPRECIATION
Investment, chassis and body - - -

various foibles of automobile salesmen, their personality and their experiences.

George M. Graham wound up the show with a one-act sketch, "Fifteen Minutes with the Automobile Editor."

Association Helps to Defeat Drastic Legislation

The officers and members have been working very hard and have helped in the defeating of several bills that have been brought up in the Legislature of Pennsylvania. Especial attention has been given to House Bill 1471, which would increase the license fees 50 per cent. on motor trucks. Secretary Metcalf sent out 300 letters to owners of motor trucks in Philadelphia, asking them to co-operate with the association, in preventing the passage of this bill. A large number of replies have been received from owners of trucks, stating that they had written to their Senators and representatives, strongly objecting to the passage of House Bill 1471.

In addition to this forty-one telegrams were sent by the association to members of the Legislature, asking them to oppose this particular bill.

The Motor Truck Association joined with the Motor Federation and the Automobile Trade Association in defraying the expense of the advertising campaign that has been carried out in the newspapers throughout the State.

Next Meeting May 19th

At the next meeting of the association, which is to be held at the Adelphia Hotel at 6.30 p.m. on Wednesday evening, May 19th, Judge Eugene C. Bonniwell, of the Municipal Court, will discuss the various bills that have been presented in the present Legislature, and their affect on the automobile industry.

Senator William C. Sproul will address the meeting on the "Good Roads Movement in Pennsylvania." An invitation is extended to every truck owner in Philadelphia to attend this meeting.

PHILADELPHIA SUBURBAN 'BUS LINES

By J. Howard Pile

The number of automobile 'bus lines between Philadelphia and its many suburbs is very limited. This is chiefly due, no doubt, to the fact that these suburbs had train and trolley service some time before automobiles had reached their present state of reliability, and now it is a hard matter to enter into competition with such well founded systems.

There are, however, a few of the suburbs in the northeastern section which have no trolley service at present, and the train service is very inadequate. Between some of these there are 'bus lines operating, and as the demand calls for it, additional ones will be opened up.

The Auto Transit Company, with offices and garage in Frankford, operates a 'bus line, consisting of three Autocars between Bridge Street, Frankford, the terminus of the trolley line, and Bustleton, Somerton, Byberry, Trappe, Neshaminy Falls and Langhorne.

The 'buses used in this service have a seating capacity of fourteen passengers besides the driver and can be closed tight in wet weather. The illustration shows the type of body used, the seats being lengthwise of the body. In addition to these cars, the company has a Mora sight seeing car, seating sixteen passengers and a touring car. When not otherwise in use, any of these cars can be hired out for weddings, funerals, block parties, picnics, etc.

The following time table shows the frequency of service and running time. Distances can be seen on the map.

Leave Frankford—7.30, 10.30, 1.30, 4.30, 7.30—time, Frankford to Byberry, 45 minutes; Byberry to Neshaminy Falls, 15 minutes; Neshaminy Falls to Langhorne, 15 minutes. Returning, the 'buses leave Langhorne at 9, 12, 3, 6 and 9.

On the other route, the 'buses leave Frankford at 7, 9, 11, 1, 3, 5, 7 and 9. Returning they leave Somerton at 8, 10, 12, 2, 4, 6, 8 and 10. On Saturdays, Sundays and holidays, an hourly schedule is maintained.

Rates of fare are as follows:

Frankford to Byberry Farms (City Line)	25c
" " La Trappe	30c
" " Neshaminy Falls	35c
" " Langhorne	40c
Neshaminy Falls to Langhorne	15c
City Line to La Trappe	10c
La Trappe to Neshaminy Falls	10c

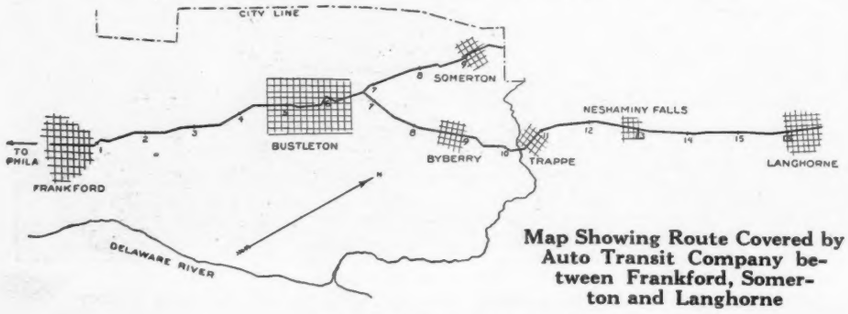
A Philadelphia Suburban 'Bus

Special 'bus body fitted to an Autocar chassis. Three of these are in use by the Auto Transit Company

In addition to the passenger carrying, packages up to 100 lbs. are carried at the following rates:

	Up to 50 lbs.	Under 50 lbs. To 100 lbs.
Frankford to Bustleton	$.10	$.15
Frankford to Somerton	$.15	$.20
Bustleton to Somerton	$.10	$.15
Frankford to Byberry	$.15	$.20
Frankford to Langhorne	$.20	$.25

Outgoing parcels are left at the Frankford office, and ingoing parcels are delivered to the driver from whom package tickets can be purchased.



Map Showing Route Covered by Auto Transit Company between Frankford, Somerton and Langhorne

The Jitney Association, Philadelphia, Pa., has made arrangements whereby every 2 weeks fifty autos controlled by the association will be filled with children from the various orphanages throughout the city and for 2 hours they will be given jitney rides. Managers of the various homes will co-operate in carrying out the plan.

The Fifth Avenue Coach Company, New York City, purposes to equip its motor 'buses with fenders which will be attached to the sides of the vehicles in front of the rear wheels, to prevent pedestrians from falling under the wheels. The Public Service Commission has approved the design of fenders to be used.

The CCJ has most advertisers because it gives them biggest returns

Detroit Farthest Advanced in Motorized Municipalities

By LEN G. SHAW

DETROIT, MICH., was one of the first cities in the country to adopt motor trucks for use in the conduct of its municipal departments. To-day, it can correctly be designated as a motorized municipality; for in several of the departments the motor-propelled vehicle has entirely supplanted the horse, while, where the old style of transportation is still to be found, it is second in point of importance. Before motor fire engines had reached a point where they could be termed a success, Detroit was the possessor of flying squadrons—motorized fire companies that carried no apparatus, but responded to alarms and assisted in fighting the flames. It has them yet, and is effecting a material saving thereby. It was one of the first cities to adopt the auto patrol. Now, nothing else is used. Likewise, it was a pioneer in the municipal 'bus line, operating motor omnibuses across Belle Isle bridge and around the island. No particular claim for credit in this respect is put forward, yet the results achieved in the various departments are of interest alike to students of municipal transportation problems, and those to whom the motor truck is something more than a mere piece of machinery.

Complete Cost Systems

Through an elaborate, but by no means complicated or expensive system of cost keeping, some of the departments are able to tell to the penny what their motor equipment costs them for a given period, or for the life of the machine, for that matter.

Hauling Pipe With Trailer

The Detroit Water Board employs fourteen automobiles and trucks in various capacities. These range from a fleet of Fords, runabouts and light deliveries—up to a one and a half ton Federal and a five-ton White. For the most part these machines are used in conveying inspectors and others from place to place, or in transporting supplies to workmen all over the city. As in every other department, there are distinctive features here. The White five-ton truck, for example, is used in hauling pipe from the storage yards to all parts of the city and the surrounding towns served by the Detroit system. The pipe carried ranges from the 48-in. mains, 12 ft. long, the pipe of 1¼ in. iron, and each section weighing from 10,400 to 11,336 lbs., down to the smaller sizes. When the latter are being transported, a five-ton Troy trailer is also brought into play, 10 tons of pipe being hauled at one operation. This cannot be done with the larger mains, because of the trouble experienced in unloading, which brings up an interesting problem, and its solution by the department.

The truck carries a "body," that cost considerably less than $20 complete. It was found that regular bodies made unloading both slow and inconvenient. Therefore three 6x6 timbers were brought into play. These are placed crosswise of the chassis frame, and securely bolted in place. Two other sections of 6x6, placed longitudinally, and used for skids when there is unloading to be done, complete the "body." All pipe at the storage yards is handled by a locomotive crane. A five-ton length is picked up and deposited on the truck, the longitudinal timbers keeping it in place, together with anchor chains.

Unloads Five Tons in Three and a Half Minutes

When the unloading point is reached, a stout rope, anchored at one end to the truck frame, is run around the length of pipe, the skids are put into place, and the driver and an assistant let the main roll off gradually. From the time the truck is stopped, until the 5 ton pipe has been deposited where wanted, and everything is in readiness for the return trip, is approximately 3½ minutes, which is keeping things moving. The longest hauls yet made were from the storage yard to River Rouge, 9 miles one way. On this run the truck made three round trips each day, or 54 miles. A team could not have made the round trip with a 5-ton pipe in an 8-hour day.

The truck did away with two double-hitch and one triple-hitch horse-drawn trucks, for which the department was paying $23.50 per day. It was found that the truck was able to go with a 5-ton casting through roads, where seven horses would be required. At one time, when it was used night and day in hauling 48-in. pipe, it averaged 92½ miles a day.

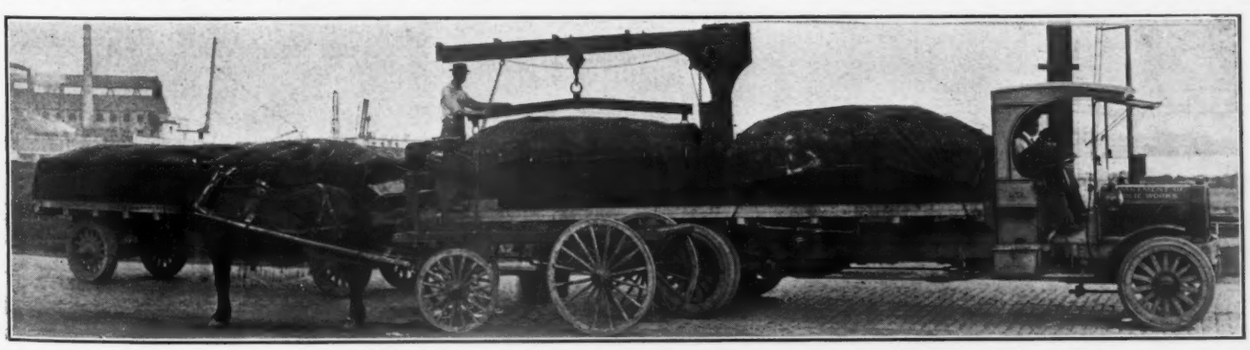
Some Operating Figures

To see what is being accomplished, it is only necessary to take the performance of one machine in each class during the year ending January 31, 1915. The White, the Federal, and a Ford with a 1000-lb. delivery body have been selected for the purpose. Here are the official figures:

	Miles Year	Gals. Gas	Qts. Oil	Other Oils	Lbs. Grease	Miles Gal.	Miles Day	Cost Gas	Oil-Grease	Repairs Material	Repairs Labor	Tire Expense	Depreciation	Misc. Expense	Total Expense	Average Per Day	Average Per Mile	Tire Exp. Per Mile
White	9,306	1,778	1,150	19	144	5.2	29.8	$203.39	$92.04	$309.80	$232.59	$497.00	$1,381.33	$5.05	$2,714.45	$8.70	$.292	$.053
Federal ...	4,173	921	101	1	4	4.5	22.9	96.71	7.28	104.27	43.53	91.80	258.72	2.25	604.58	3.32	.145	.022
Ford	8,487	716	133	..	38	11.9	27.2	83.01	11.26	80.24	134.82	169.18	242.31	5.90	725.68	2.33	.086	.02

These figures do not include the cost of drivers for the trucks, who are paid $3.08 per day of 8 hours. When hauling pipe each truck carries a helper, to assist in unloading. He is paid $2 per day. The items for material and labor for repairs are unusually heavy, because in each instance there was an accident, a locomotive essaying to put the White truck out of business by running into it.

The fourteen machines operated by the water board last year covered 99,470 miles, at a total cost of $10,121.27, including a generous allowance for depreciation in each instance. Repairs are made in the garage



Detroit's Truck, With Crane and Trailer, Used in Collecting Garbage

This outfit does the work of sixteen teams

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

maintained by the department, as is the case with the other branches of municipal service.

Cable Drawing by Truck Winch

The public lighting commission uses fifteen motor vehicles of all types, the heaviest being a Packard two-ton truck and a Kelly one and a half ton truck. The latter is used in transporting material to different parts of the city. The Packard is unique in that it is used chiefly in pulling cables through the lighting conduits. Formerly, the work was done by horses. This method never was satisfactory. There was no certainty as to the strain that would be exerted—sometimes more, sometimes less. Pulling a cable is something of a science, for it must go just so far and no further, a thing that was next to impossible with horses, on account of the impossibility of stopping them on the instant. To overcome this difficulty, the truck is equipped with a winch located just back of the driver's seat, and operated through a clutch from the motor. The driver stands on the running board, and manipulates the control levers according to signal. Formerly delays from cables broken in being drawn were frequent. Now, such a thing is practically unknown, and the work is accomplished in a fraction of the time required by the old plan. A considerable saving is also effected through getting the crew to the work in much less time.

Here is a schedule of operation and maintenance expense, exclusive of the driver's wage, of the Packard truck for the 7 months beginning July 1, 1914:

Month	Miles	Labor	Material	Gas—Oil	Total Cost	Cost per Mile
July ...	293	$9.36	$1.79	$10.29	$21.44	.0731
August..	330	7.34	4.00	11.25	22.59	.0684
Sept. ...	420	9.93	2.54	14.77	27.24	.064
Oct.	384	11.54	55.18	18.63	85.35	.222
Nov. ...	352	5.15	2.91	14.37	22.43	.063
Dec. ...	117	6.45	19.10	16.92	42.47	.3623
Jan. ...	380	45.76	21.16	15.57	84.49	.2223

It will be noticed from the foregoing table, that the gasoline consumption seems heavy, when the mileage is considered. This is due to the fact that while the winch is in operation, which is pretty much all the time the truck is out, the motor is running, although the truck is standing still. Hence the figures given here cannot be taken as a basis for computing the gasoline consumption per mile traveled. The driver is paid $2.75 per day. While the cost of operation per mile may seem high on the face of the showing, the engineering department expresses itself as more than satisfied with the saving effected in the matter of time, the ease and accuracy with which the work of drawing cables is performed, and the elimination of many problems that had to be met with horses.

Winch Also Erects Poles

The windlass is also used to advantage, in placing the iron poles that are used for street illumination. Formerly, it was necessary to erect a gin pole on the ground and swing the poles off the truck and into place by hand, a laborious process. Now an ingeniously devised arrangement is assembled on the back of the truck, the cable operating on the windlass drum is attached to the lighting pole, and the engine hoists and lowers it with no effort on the part of the workmen.

Detroit's Truck Unloading Five-Ton Water Main

The entire operation occupies only three and a half minutes, the main being allowed to roll gently down the skids, by means of the rope shown

Operates 'Buses on Three-Cent Fares and Makes Money

The park and boulevard department has motor 'buses—Packard chassis, with special bodies designed by the department. This service was inaugurated 4 years ago, with two motor 'buses. Gradually this equipment has been increased to nine. Mix them up, and it would be impossible to tell which left the factory first, so thorough has been the upkeep of the department garage. These 'buses seat twenty-six persons each, although as high as thirty-eight passengers can be cared for.

From the loading station at the bridge approach to the aquarium and horticultural building on Belle Isle is 1¼ miles. The fare between the two points, or to intermediate stops, is $.03 between May 25 and September 25, and $.05 the rest of the year. Last year, 648,909 passengers were carried, of which 44,850 were employes. Also, there were carried around Belle Isle 13,857 passengers, the fare here being $.10. Receipts for the year were $26,016.11. Cost of operation was $22,167.31, of which $12,-012.11 was for wages, and $10,155.20 for supplies. Net profits for the year were $3848.80.

The maximum speed of the cars is 10 m.p.h., and they travel from 80 to 100 miles each daily. Two are used constantly, the others running on a sliding scale according to demands. During the winter a 15-minute schedule is maintained. In the summer, this is reduced to 5 minutes or less, during the low fare period. It is asserted that, if a straight $.05 fare was charged the year through, the net profits would be around $10,000. Only one man is required on each 'bus—he is the driver. A "pay-as-you-enter" system is employed.

Truck and Trailer Collect Garbage—Crane on Truck

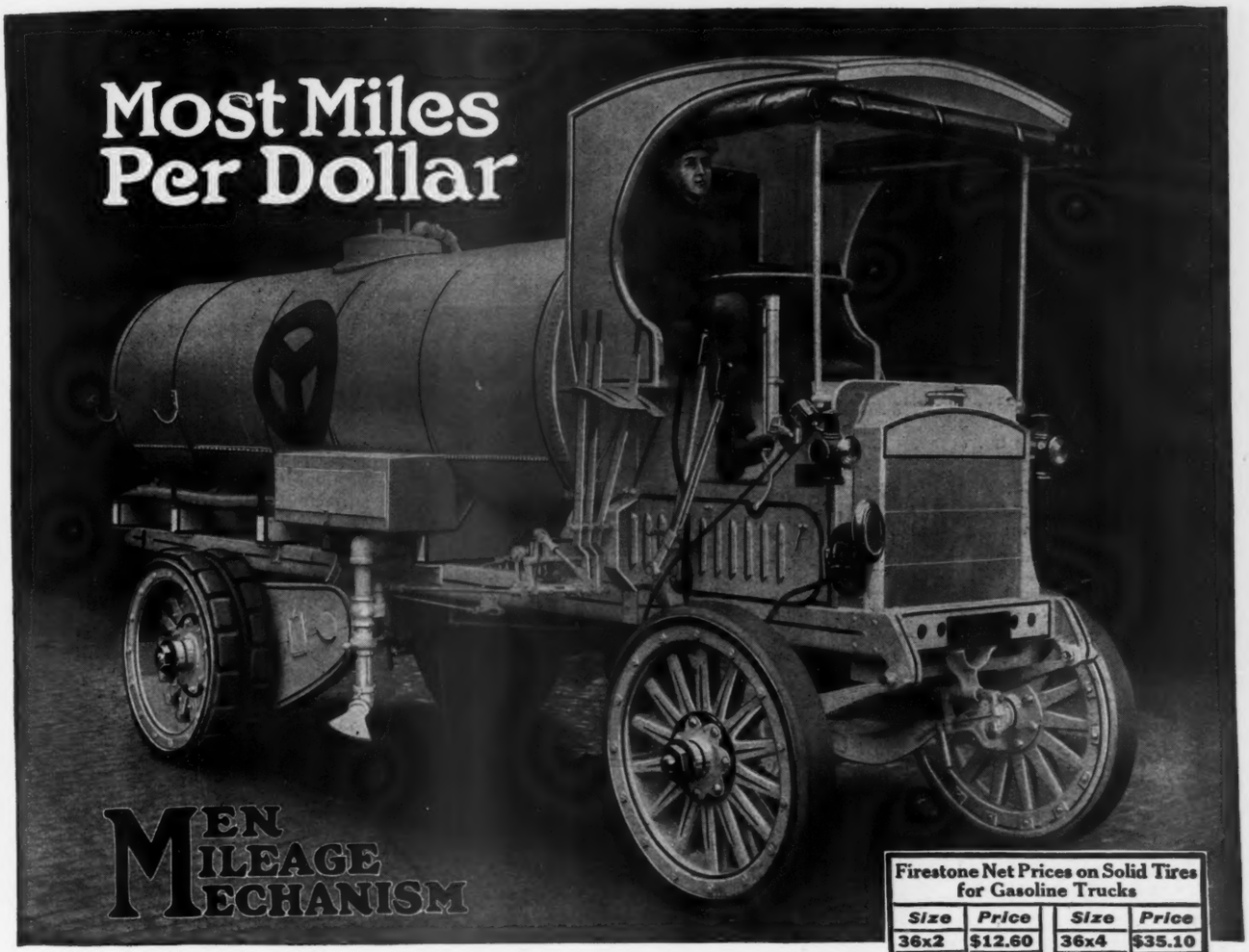
In its daily collection of garbage, the department of public works is confronted with an unusual situation. The reduction plant, to which the city turns over its refuse, under contract, is located some miles west of Detroit. From the easterly city limits to the loading station on the west side, from whence the garbage is shipped by train to the reduction plant at French Landing, is a trifle more than 8 miles. Formerly, it was the practice to have horse-drawn wagons collect the garbage, and transport it across the city, a one-horse outfit making the round trip in one day. Now, this work is done by a Peerless truck and a Troy trailer, in less time, and at a fraction of the expense.

When the solution of the problem was first put up to some truck engineers, they declared it could not be worked out along the lines laid down. Superintendent of Street Cleaning, J. J. Knight, was a machinist before he took up his present duties, so he designed, and the department had installed on the Peerless truck, a crane for loading and unloading. The truck is provided with double engine springs and the others are of an extra heavy type. A 21-ft. platform was built, and the hoist was located amidship. It has a swivel base, that permits it to be turned in any direction, and the hoisting mechanism traverses the length of the arm, giving it a wide reach on either side. When placed at right angles with the truck, and astride another wagon, the arm is supported at the outer end and by a collapsible tripod, to guard against the truck overturning.

A receiving station on the east side, some 8 miles from the west side station, is a rendezvous for the garbage wagons of the horse-drawn type. Here four loaded boxes, each weighing 2 tons, are placed aboard the truck by the hoist, as they are taken from the horse-drawn wagons. A like number of boxes are placed on the trailer, and the outfit is off on its journey across the city. Two round trips are made each day, and a third could be marked up if there was a sufficient supply of garbage to warrant it. Instead, the truck often skirmishes around the east side, meeting full wagons, exchanging those boxes for empties, and sending them on their way again, with a minimum loss of time in transit. Thirty-two tons of garbage is the daily average—the work of sixteen teams under the old plan.

Downtown collection is cared for by two Packard trucks, each carrying four boxes, a driver and two men. They dispose of twenty-four boxes of garbage a day, the trucks averaging 20 miles each, much of the time, of course, being consumed by stops. The west side, where hauls are comparatively short, is cared for by teams.

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?



Firestone Net Prices on Solid Tires for Gasoline Trucks			
Size	Price	Size	Price
36x2	$12.60	36x4	$35.10
32x2½	17.05	36x5	42.95
36x2½	18.95	42x5	49.95
34x3	22.10	36x6	52.70
36x3	23.30	40x6	58.50
32x3½	24.55	36x7	64.65
36x3½	27.35	40x7	71.90
34x4	33.20		

YOU do more than cut down tire mileage cost when you apply Firestone Equipment to your Trucks.

You protect your drivers from the fatigue and ill-temper of needless rack and jar.

You conserve their energy. And the resiliency of Firestone Tires means more than this comfort to them. Firestone grip and traction mean easier handling, easier steering.

Truck mechanism comes in for this greater protection. Fewer lay-ups, less repair expense.

There is a Firestone Tire and Rim Equipment for every Truck and sure service need.

Call in a Firestone representative. Write for catalog.

Firestone Tire & Rubber Co., Akron, Ohio—Branches and Dealers Everywhere

"America's Largest Exclusive Tire and Rim Makers"

Firestone

TRUCK TIRES

When Writing, Please Say—"Saw Your Ad. in the C C J"

A YEAR'S RECORD OF DUMPING-BODY COAL TRUCKS

By J. E. Foland

Several of the larger firms in Kansas City are finding by experience that motor trucks, fitted with special dump bodies, pay.

The Central Coal and Coke Company operates a fleet of four five-ton Pierce-Arrow trucks all fitted with special hand-dump bodies. The year just passed these trucks have shown a wonderful saving, as can be seen by the accompanying sheet, which is the record for the 12 months ending in November, 1914.

To facilitate loading, this firm purchased a special Browning hoist for $7000, and with it a five-ton truck can be loaded in a fraction less than 5 minutes. Fifteen minutes are consumed in unloading. Some firms in the city have an objection to the special crane for loading purposes, claiming that dropping such a load at one time into the body is hard on the springs and axles. The firm above mentioned has offset this by the use of a screen that runs alongside the truck, and not only takes the weight from the truck body, but at the same time screens the coal. Where a a firm has not its own tracks and yards this special loading device could not be used, for the freight cars are constantly being shifted.

H. A. McDonald, in charge of the trucks for the above firm, is of the opinion that the special dump body will be the ultimate solution of the coal man's delivery problem. A great deal of difficulty has been encountered in the way of hills and bad street conditions, but despite these the truck delivers the coal quicker and cheaper than it could be delivered by any other means.

Five five-ton Pierce-Arrow trucks, fitted with special hydraulic dump bodies, are employed by the Stewart-Peck Sand Company. These trucks are all loaded by hand, as the firm has not its own yards, and their shipments are placed in different parts of the city. With this method about ten minutes are used up in loading, while the unloading is done in about two.

What is probably a record was made by this firm last summer, when a mechanical loader was being used as an experiment. One hundred and thirty-two yards of sand was hauled a distance of twenty-six blocks (round-trip) through the heart of the city in 10 hours.

Lumber firms here are seeing the possibility of the special dump bodies, and are taking readily to them.

Hugh A. Smith, of Catawa, Ky., has just placed on the market a wagon bed scale which he invented. The device weighs the contents of a vehicle, and can be applied to a wagon or truck, and with a slight lever manipulation, will weigh the contents of a vehicle. The scale is made by the Wagon Bed Scale Company, the officers of which are J. B. Judah, president; Gustave Flexner, secretary, and Morris Abraham, treasurer.

Rapid Loading Methods Employed by Central Coal & Coke Company, of Kansas City, Mo.

By means of this hoist the five-ton Pierce-Arrow truck is loaded in five minutes. At the same time the coal is screened

Form C 111—6-15

CENTRAL COAL AND COKE COMPANY

STATEMENT EARNINGS AND STATISTICAL DATA. MOTOR TRUCK NO. 3-4-5-6-7 MONTH OF Dec. 1912 to Nov. '13 Inc. 191

OPERATING EXPENSE AND CREDITS		AMOUNT	COST PER TON
Drivers—Hours 9214	Rate 30c	2,764.20	.0978
Helpers—Hours 9214	Rate 20c	1,842.80	.0652
Machinist — Hours	Rate		
Gasoline 9673 @ .15168¢	Gal.	1,467.20	.0519
Lubricating Oil 1072 @ 4¢	Pints	42.88	.0015
Lubricating Oil	Pints		
Grease	Lbs.		
Tires and Casings		1,070.40	.0378
Other Material and Supplies		1,155.41	.0409
Company Shop Repairs			
Miscellaneous Repairs		849.65	.0300
Fire and Liability Insurance		1,140.00	.0403
Damage to Property			
Depreciation		4,544.40	.1608
TOTAL EXPENSE FOR MONTH		14,877.14	.5262
CREDITS			
Tons @	$		
28257.295 Tons @	50c	$14,128.65	
on Hauling			

STATISTICAL DATA		
Average Daily Mileage		85.
Total Mileage for Month		
Net Running Time, in Hours	9,214	
Delays, in Hours		
Total Running Time	9,214	
Average Loads Per Day		6.134
Total Loads For ~~Month~~ Year	5,652	
Average Daily Tonnage		30.668
Total Tonnage For ~~Month~~ Year	28,257.295	
Average Tons Per Load		4.999
Total Expense Per Day		16.145
Total Expense For ~~Month~~ Year	14,877.14	
Cost Per Ton to Deliver		.526
Average Miles Per Gallon Gasoline		
Average Round Trip, in Miles		6.5

Record Sheet Kept of Each Truck, by the Central Coal and Coke Company

WHAT IS A PROSPECT?

A Prospect is a man who may buy today, to-morrow, next week or next month. He has a vague idea of what he wants but is willing to listen to arguments that will show him why your way of thinking is better.

You can aways sell a certain per cent. of your prospects. Therefore, it's up to you to get all you can, for the more prospects you have the more sales you will make. That's simple arithmetic. The big thing is getting the prospects. Root them out. See to it that you and your salesmen turn in each day a certain number of new prospects.

When you call on a prospect, leave a piece of your truck literature that you think after your conversation will best fit his needs—something to remind him of your visit and of what you told him.

You know it is easier to consummate a sale if you furnish your prospect with the leads and let him unconsciously pick up the thread by thinking that the suggestions are his. A man always falls easier for something which he thinks is his "own baby."

If you once get him reading the proper literature that fits into his particular needs, you get him thinking more and more your way. Remember the man you start now is the man you will close later.

Extracts from "Chase-'em."

The CCJ has most advertisers because it gives them biggest returns

EVANSVILLE BREWING ASS'N. 8 WHITE TRUCKS
THE ATLANTIC REFINING CO. 70 WHITE TRUCKS
JOSEPH HORNE CO.-30 WHITE TRUCKS
INDEPENDENT BREWING CO. 7 WHITE TRUCKS
FRANK PARMELEE CO. 9 WHITE TRUCKS
NATIONAL CASKET CO. 14 WHITE TRUCKS
MANDEL BROS. 17 WHITE TRUCKS
B. ALTMAN & CO. 35 WHITE TRUCKS
CITY of NEW YORK 12 WHITE TRUCKS
AMERICAN CAN CO.-8 WHITE TRUCKS
T. EATON CO. Ltd. 14 WHITE TRUCKS
SPEAR & CO. 13 WHITE TRUCKS
GREENFIELD ELECTRIC LIGHT & POWER CO 10 WHITE TRUCKS
KAUFMANN & BAER CO. 40 WHITE TRUCKS
MARSHALL FIELD & CO. 15 WHITE TRUCKS
GIMBEL BROTHERS 54 WHITE TRUCKS
THE B.F. GOODRICH CO.-18 WHITE TRUCKS
THE HIGBEE COMPANY 10 WHITE TRUCKS
ARMOUR & COMPANY 71 WHITE TRUCKS
ATLANTIC ICE & COAL CORPORATION 15 WHITE TRUCKS
STANDARD OIL CO. of NEW YORK 76 WHITE TRUCKS
THE CLEVELAND AKRON BAG CO. 13 WHITE TRUCKS
BOGGS & BUHL 28 WHITE TRUCKS
CHICAGO FIRE INSURANCE BOARD 13 WHITE TRUCKS
TELLING'S ICE CREAM
W. & J. SLOANE 13 WHITE TRUCKS
TELLING BROTHERS CO. 10 WHITE TRUCKS
GULF REFINING CO 101 WHITE TRUCKS
SOUTHERN EXPRESS CO. 8 WHITE TRUCKS
ASSOCIATED BELL TELEPHONE CO'S 45 WHITE TRUCKS
STERN BROTHERS-18 WHITE TRUCKS
SAKS & COMPANY 10 WHITE TRUCKS
STANDARD OIL CO. of INDIANA 65 WHITE TRUCKS
THE BELL CO.
THE BELL CO. 12 WHITE TRUCKS
N.Y. BOARD of UNDERWRITERS 14
KAUFMANN'S
KAUFMANN BROS. 24 WHITE TRUCKS
GLACIER PARK TRANSPORTATION CO 11 WHITE TRUCKS
CITY of BOSTON 21 WHITE TRUCKS
CITY OF CLEVELAND 17 WHITE TRUCKS
CITY OF PITTSBURGH 13 WHITE TRUCKS
THE HUB 10 WHITE TRUCKS
SCHULZE BAKING CO. 12 WHITE TRUCKS
LOS ANGELES BREWING CO. 13 WHITE TRUCKS
THE MAY COMPANY 11 WHITE TRUCKS
10 WHITE TRUCKS
SUPREME BAKING CO. 18 WHITE TRUCKS
UNITED STATES POST OFFICE DEPT. 28 WHITE TRUCKS
OPPENHEIM COLLINS & CO. WHITE TRUCKS
THE ROSENBAUM CO. 35 WHITE TRUCKS
R.O. SUMMERS CLEANING CO.

This Is Prestige

... that a man buy again

THIS page is a record of White Truck *prestige*. These names familiar for the commercial wisdom they stand for nationally and locally represent purchasers of large fleets of White Trucks.

A good judge of trucks as well as one uninformed may make a mistake in his first truck purchase. But when he continues to buy the same truck again and again as his needs expand . . . the evidence of satisfaction is overwhelming.

Whether you are ready for purchase this year or not . . . permit us to send you illustrated data of White Trucks now in operation built to meet delivery conditions similar to your own.

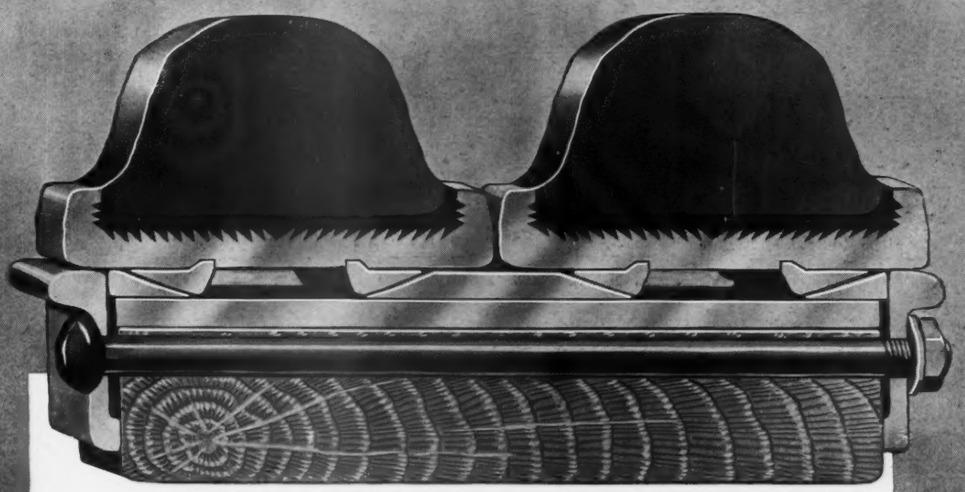
Exhibiting at the Transportation Building, Panama-Pacific International Exposition, San Francisco.

THE WHITE COMPANY
CLEVELAND
LARGEST MANUFACTURERS OF COMMERCIAL MOTOR VEHICLES IN AMERICA

New York	Broadway at Sixty-Second Street	Pittsburgh	Craig Street and Baum Boulevard	Seattle	1514 Third Avenue
Chicago	2635-2645 Wabash Avenue	Atlanta	63-65 Ivy Street	Memphis	278-280 Monroe Avenue
Philadelphia	216-220 North Broad Street	St. Louis	3422 Lindell Boulevard	Dallas	2025-2027 Commerce Street
Boston	930 Commonwealth Avenue	Washington	1233 20th Street, N. W.	Toronto	14 Alexander Street
San Francisco	Market St. and Van Ness Avenue	New Orleans	750 St. Charles Avenue	Montreal	Forum Building
Baltimore	Mount Royal and Guilford Avenues	Newark	33-35 William Street	Winnipeg	230 Fort Street

When Writing, Please Say—"Saw Your Ad. in the C C J"

GIBNEY
PRESSED-ON
WIRELESS TIRES
Last month we made an announcement which evoked widespread interest. It introduced a new model of GIBNEY PRESSED-ON TIRES in which the intermediate steel band was dispensed with.
This construction reduces weight without sacrificing strength and makes GIBNEY TIRES both the simplest and most durable tires produced in this country.
This great improvement met with practically universal approval, and in the minds of dealers and users placed GIBNEY TIRES farther in advance than ever.
In your quest for service, satisfaction, maximum mileage, least trouble and greatest value, you can go far and travel long without finding a tire that will equal the GIBNEY make in any or all of these respects.
GIBNEY TIRE & RUBBER CO.
Factory, Conshohocken, Pa.
BRANCHES
New York, Philadelphia, Boston, Detroit, Chicago, London, Paris
AGENCIES—Washington, Baltimore, Norfolk, Wilmington, Harrisburg, Cincinnati, St. Louis, Kansas City, Milwaukee, St. Paul, Minneapolis, Duluth, Paterson, Elizabeth, Newark, Worcester.



GIBNEY

DEMOUNTABLE

WIRELESS TIRES

The solid tire business presents ever increasing possibilities for dealers. Of the whole field the Gibney exclusive agency offers by far the greatest opportunity for profit and permanence.

The two very simple types, Pressed-on and Demountable (both made single and dual), their unapproached quality, their exceptional durability and the remarkable mileage records they have made, constitute a selling force which rises superior to all competition.

The superiority of GIBNEY TIRES is not a mere claim—it is a proven fact. It is this which has caused one of the most phenomenal growths of the industry and which keeps our factory going day and night.

It is likewise this which has caused our agents to attain remarkable success. If you want to secure an agency that means present profit and future growth ask us to place in your hands the facts about GIBNEY TIRES and the agency for them.

GIBNEY TIRE & RUBBER CO.

Factory, Conshohocken, Pa.

BRANCHES

New York, Philadelphia, Boston, Detroit, Chicago, London, Paris

AGENCIES—Washington, Baltimore, Norfolk, Wilmington, Harrisburg, Cincinnati, St. Louis, Kansas City, Milwaukee, St. Paul, Minneapolis, Duluth, Paterson, Elizabeth, Newark, Worcester.

SIGNAL

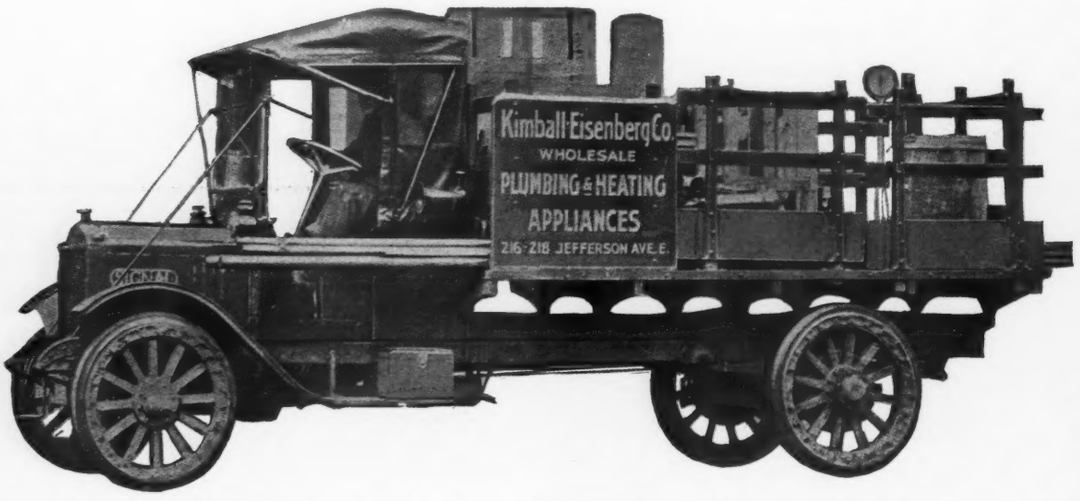
Worm-Drive Trucks

Simple, Silent and Efficient

The Signal Line

One ton Chain-drive chassis	$1400
One ton Worm-drive chassis	$1500
One and one-half ton Worm-drive chassis	$1700
Two ton Worm-drive chassis	$2000
Three and one-half ton Worm-drive chassis	$3000

All prices F. O. B. Detroit



Worm-Drive Truck Used in a Wholesale Plumbing and Heating Business

Signal Motor Truck Company

Motor Truck Manufacturers

Detroit, Michigan, U. S. A.

When Writing, Please Say—"Saw Your Ad. in the C C J"

Jeffery Quad Climbing Sixteen-inch Hurdle

Record Sales!

More than 1,000 Jeffery Quads built, bought and delivered in past four months—a new record in motor truck sales and production. Sensational performance wins position of LEADERSHIP for the truck that drives, brakes and steers on all four wheels.

Jeffery Quad used by Standard Oil Co. at Austin, Minn.

PRACTICALLY unknown a year ago, the Jeffery Quad today is delivering service in every civilized country in the world—service of a kind which it is safe to say cannot be equalled by any other truck built either in Europe or America.

Before the public announcement was made eight months ago the Quad had demonstrated its phenomenal power, stamina and efficiency by a year of the hardest kind of service in the United States Army. Uncle Sam had specified a truck that would go anywhere a four-mule team would go. The Jeffery Quad met these specifications.

Since then eight of the world's leading governments have standardized on the Jeffery Quad for army field service work. These governments have taken this important step only after the most extensive investigations and the severest tests under actual working conditions.

The biggest business houses of America are buying Quads for commercial service—Standard Oil Company, DuPont Powder Company, Hines Lumber Company, Bissell Carpet Sweeper Company, Bethlehem Steel Company, and scores of others.

The Jeffery Quad has demonstrated, once and for all, its ability to meet and solve hauling and traction problems which positively stump the ordinary type of truck, no matter how well built. It has demonstrated the amazing power and efficiency of the four-wheel-drive type of truck when properly designed and constructed.

(*Continued On Next Page*)

Parsons Lumber Co. Quad Unloading After Cross-Country Haul.

Mail Coupon on Last Page of this Announcement for FREE BOOKLET

(*Continued from preceding page*)

The Jeffery Quad drives, brakes and steers on all four wheels. M. & S. locking differentials on both front and rear drive shafts put the full power of the motor into any wheel or wheels that can get traction when others cannot. The internal spur gear (driving on each wheel) gives a leverage which means tremendous power. These features make the Quad absolutely unrivaled on poor roads—and the most economical on good roads. The saving on tires alone is an item which no truck owner can afford to overlook.

The pictures and statements on these pages give, in outline, the story of the Jeffery Quad. For a booklet which goes into details and contains valuable truck data, mail the coupon on the last page of this announcement.

Jeffery Quad

Power on all Four Wheels

Ask for Free Booklet on the Jeffery Quad—
See Coupon on Page Four of
this Announcement

Climbs Bad Clay Hills

A. H. Caward, President of the Hawkeye Oil Company, Waterloo, Iowa, says of his Jeffery Quad:

"We are using this truck at our Calmar Station where we have a great many bad clay hills, and we have had no difficulty in getting through any kind of roads. If we can only get a foothold with one wheel, we are sure to be able to pull out. For a truck to use the year 'round in all seasons, we believe a Quad Truck is the only thing, especially if it is to be used on country roads."

Reduces Tire Expense

W. H. Bush, of Montesano, Wash., on Oct. 19, 1914, wrote to the Du Pont Powder Company in reply to a letter asking for his experiences with a Jeffery Quad truck. In his letter Mr. Bush remarked:

"Old truck men particularly notice the small wear the tires show, and we ascribe it to the fact that all wheels pull and there is not the slipping and sliding you have with the two wheel drive."

Du Pont Uses Because Easy-Riding

In January 1915 the Du Pont Powder Company bought a Jeffery Quad for carrying explosives because of its easy-riding qualities. The truck gently pulls itself over obstacles with the front wheels, instead of being bounced over them by the rear wheels from behind.

Uses Quad Like Locomotive

The E. H. Warren Transfer Company, Rockford, Ill., is hauling coke for 45.7 cents a ton where formerly it cost them 82.9 cents by horse wagons, or a saving of 37.2 cents a ton. Writing under date of Oct. 3, 1914, Mr. Warren says:

"We find our truck the handiest thing we have. We use it the same as a locomotive. We pull anything we hitch to. We

(*Continued on next page*)

Drives, Brakes and Steers

Load, 7,540 pounds—Quad owned by Rem Snowdon, haulage contractor, Jamestown, N.Y.

This Quad reduced hauling costs two-thirds for George Wade, Wisconsin road builder

Quad owned by O'Neil Oil & Paint Co., Milwaukee

Jeffery Quad in the European War

Highland Brewing Co. Quad—Highland, Ill. Makes long trips through mudroads

Quad operated by Thorkildson & Brady, Goldfield, Nevada—hauling ore and supplies

Quad used by St. Croix Lumber & Manufacturing Co., Winton, Minn. Hines Lumber Co. subsidiary

One of six Quads in U. S. Army Signal Corps. Most powerful portable wireless station in the world

Jeffery Quad in service of E. H. Warren Transfer Co., hauling trailers over crest of hill

on All Four Wheels

Jeffery Quad in army service, pulling through heavy mud

Spencer Bros., Chicago, use Quad for hauling clay products

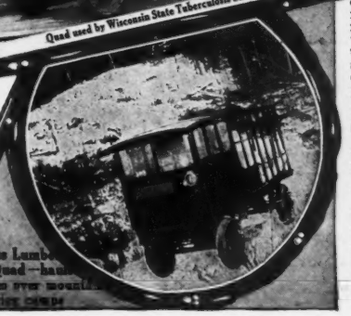
Mogollon Stage and Express Line, Silver City, N. M.—passing 4- and 6-horse teams on road

Quad in service of Benton City Dray Line

Quad used by Wisconsin State Tuberculosis Sanatorium

James Henderson, haulage contractor, Redlands, Cal., carries 2 to 6 tons extra on trailers

Power dump body owned by E. W. Milburn, San Francisco


Hines Lumber Co. Quad—hauling supplies over mountain to logging camps

push our 2 and 3 ton wagons in and out of the yards with the front of the truck. When our large vans are stuck in the mud, loaded with 5 or 6 tons of household goods and our horses cannot pull them out, we pull them out with our Quad truck."

Only Thing for Desert Work

Under date of Feb. 22, 1915, the Death Valley Trucking Company, Zabriskie, Cal., wrote as follows:

"We have two Jeffery Quad Trucks running from Zabriskie, Cal., to the McCausland Mines, a haul of 30 miles over a desert road. A part of the way we have a climb of about 15 per cent grade which we have no trouble in making with a 2½-ton load. We think the Jeffery Quad truck is the only thing for desert work and hill climbing. We have been operating for about three months and can speak in the highest terms of this machine."

Delivers Across Vacant Lots

The Parsons Lumber Co., Rockford, Ill., on April 20, 1914, bought the first Jeffery Quad truck that was placed in commercial service. Mr. Parsons deferred buying a motor truck for several years owing to the fact that the ordinary rear-wheel drive truck was unable to make deliveries of cement and lumber into vacant lots and over freshly excavated dirt near to the cellars of new houses. Writing under date of Sept. 25, 1914, Mr. N. H. Parsons said:

"We carry an average load of a trifle over 2 tons, and have found the truck would go anywhere we wanted to place the material."

Mr. Parsons is operating his truck for a total cost of about 4 cents a mile, including gasoline, oil, grease, license, repairs, upkeep and maintenance, but not including the driver's wages, insurance, depreciation, interest, storage, etc.

(*Continued on next page*)

(Continued from preceding page)

Forty Rods Through Two-foot Snow

R. A. Boyd, agent for the Standard Oil Company at Austin, Minn., in a letter dated Jan. 21, 1915, says:

"We went with our Jeffery Quad through snow two feet deep. Of course, we went slowly, but we had to pull through this drift for a distance of 40 rods and all we cared about was getting through. This Jeffery Quad is the only truck that I could use in my business."

It is significant that after Mr. Boyd had operated his truck for a winter in the mountains, the Standard Oil Company at Chicago, placed an order for Quad trucks.

Pulls Trailers on Heavy Grade

B. C. Steele, of West Acton, Mass., under date of March 3, 1915, writes:

"My Quad truck will pull 6 tons on a good road, two tons on the truck and four on the trailer. I pulled another truck with three tons on it on the heaviest grades from here to Boston, and could not tell the difference with my truck. I am much interested in trailers, as that is one of the reasons I bought a Quad truck."

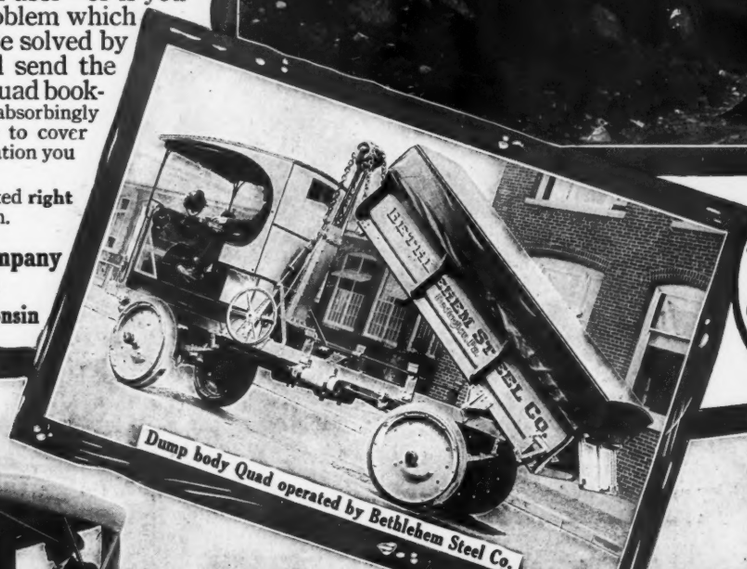
Quad Booklet — FREE Mail Coupon Below

If you are a motor truck user—or if you are facing a haulage problem which you thought could not be solved by motor trucks—sign and send the user's coupon. Get the Quad booklet **at once.** You will find it absorbingly interesting—filled from cover to cover with the kind of truck information you have been looking for.

If you are a dealer — get posted **right now.** Use the dealer's coupon.

The Thomas B. Jeffery Company
Main Office and Works
Kenosha Wisconsin

Quad owned by Death Valley Trucking Co., —negotiating rough incline



Dump body Quad operated by Bethlehem Steel Co.

The Thomas B. Jeffery Company
Jeffery
Kenosha, Wis. U.S.A.

One of Uncle Sam's Fleet of Jeffery Quads

Jeffery Quad used by Marshall Oil Co., Marshalltown, Iowa

Dealer's Coupon

The Thomas B. Jeffery Co.,
Dept. 5C, Kenosha, Wis.

Please send me free of charge and without obligation, your booklet on the Quad containing valuable data on haulage problems. Also give me details of your dealer's proposition.

Name.....

Firm Name.....

Address.....

User's Coupon

The Thomas B. Jeffery Co.,
Dept. 5C, Kenosha, Wis.

Please send me free of charge and without obligation, your booklet on the Quad containing valuable data on haulage problems.

Name.....

Firm Name.....

Address.....

Steel Bodies for Motor Trucks

Built to meet special haulage requirements and adapted for any service. We are completely equipped to supply steel truck bodies for all purposes.

Used by the Jeffery Quad and other high-grade motor vehicles.

Motor Truck **MAKERS, DEALERS** and **USERS**—equip your trucks with this dependable, durable and highly efficient Steel body—supplied with hand or power hoists, as required.

Our steel dump bodies especially adapted to efficient haulage of coal, crushed stone, lime, cement, building materials, asphalt, etc., etc.

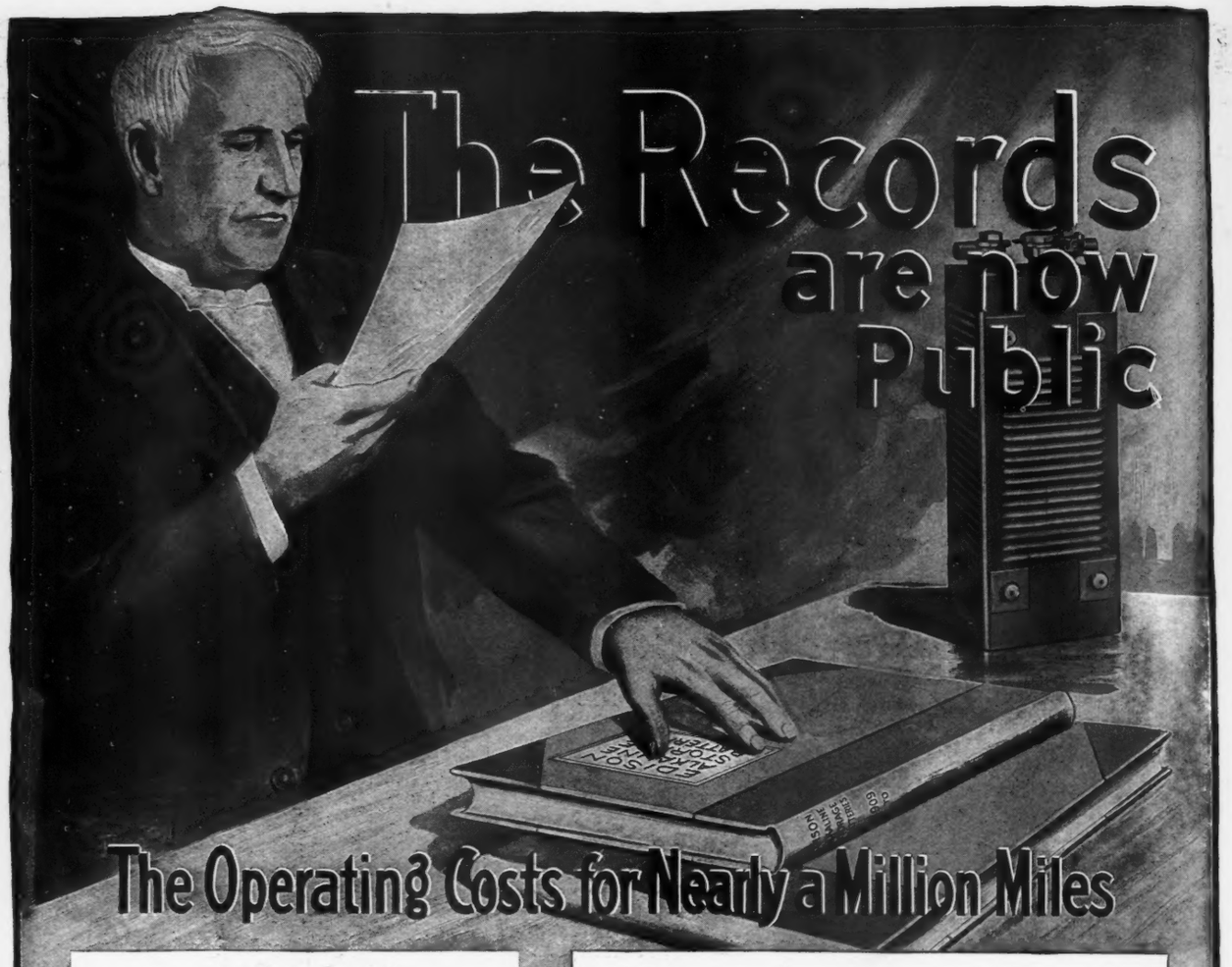
Varco Steel Bodies Outlast the Truck

When requesting estimates, give body dimensions and nature of business

SEND FOR LITERATURE, DATA, PRICES, ETC., ETC.

Motor Truck Body Department

Variety Manufacturing Co., Sacramento and Carroll Avenues, Chicago, Ill.

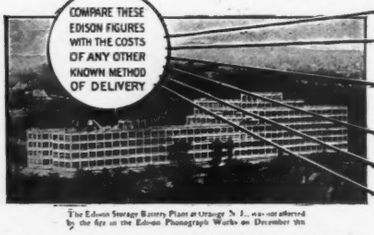


The Operating Costs for Nearly a Million Miles

I CLAIMED that the **New Alkaline Storage Battery** would make the Electric Vehicle the cheapest means of Street Transportation, but I had only my private tests to satisfy me. Today thousands of Edison Batteries in thousands of Trucks and Delivery Wagons are making Operating Records that are easily investigated by all. After the four or five years of hard service that many of these vehicles have had, is it possible to deny that my claim is proved?

Thomas A. Edison

HERE IS ONE RECORD—A REPORT—ON 22 FIVE-YEAR-OLD EDISON BATTERIES



The Edison Storage Battery Plant at Orange, N. J., as it appeared by the fire on the Edison Phonograph Works on December 9th

Write for Bulletins on the use of **Edison Batteries** for Lighting Country Houses, Ignition and Lighting of Gasoline Cars, Yacht Lighting, Railway Train Lighting and Signaling, Telephone, Telegraph and Wireless *and, High-priced or Low-priced Passenger Electrics.*

Edison Storage Battery Company

Orange, New Jersey

Distributors in { New York, Chicago, Boston, Cleveland, Washington / San Francisco, Los Angeles, Portland, Oregon, Seattle

ADAMS EXPRESS COMPANY

242 WEST 47TH STREET

MOTOR VEHICLE DEPARTMENT
GEORGE STEVENS
SUPERINTENDENT

NEW YORK, December 7th 1914.

Edison Storage Battery Company,
Orange, N. J.

Attention of
Mr. A. Bachman,
V.P.& Genl Mngr.

Gentlemen:-

Thank you for consenting to extend from five to six years the conditions of your guarantee regarding renewal of positive plates.

The average operating cost per battery per month of the twenty-two trucks at Indianapolis, equipped with Edison Batteries in November 1909 and averaging about 660 miles per month, is as follows:-

YEAR	BATTERY MAINTENANCE (Refilling, new solution, watering, cleaning, all repairs, inspection, etc.)		CURRENT (Purchased by meter)	TOTAL
	Material	Labor		
1910	$3.47	$4.10	$10.05	$17.62
1911	3.41	4.10	8.93	16.44
1912	3.41	4.10	9.90	17.41
1913	2.86	4.10	8.17	15.13
1914(to Oct.31)	3.11	4.10	9.50	16.17

The average total operating cost per battery per month has, therefore, been $16.55 for a period of five years. In this time the average mileage per truck was about 40,000, which reduces the operating cost to $.02½ per mile. The batteries are still in service.

Yours very truly,

Geo. Stevens

Superintendent

QS•RHW

In the terrific strain on the battlefield and in the hardest commercial service

WEST'S CAST-STEEL WHEELS

are proving their superiority to all other wheels

Stronger, lighter and safer than wooden wheels

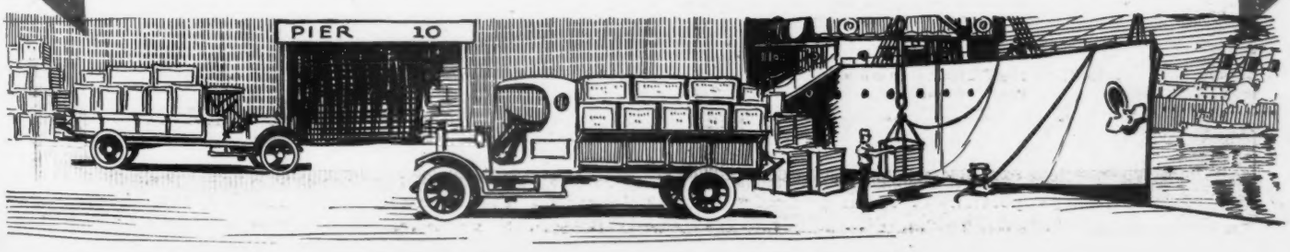
Save tire wear and wheel trouble—are more economical

Europe to-day, both on her battlefields and in her heavy commercial hauling, uses steel wheels almost exclusively, because they stand up under the hardest kind of service and give no trouble.

West's Cast-Steel Wheels are cast in one piece, have no joints to open, bolts to shear or rivets to break; will not warp, shrink, twist, loosen or get out of true and are impervious to climate.

Write about them for your trucks

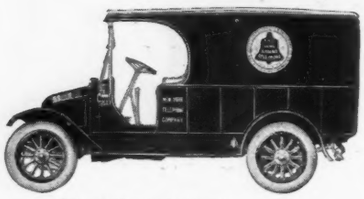
The West Steel Casting Co., Cleveland, Ohio



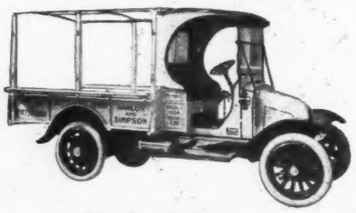
One-Third of Our Business Is Repeat Orders

Stewart Delivery Trucks

In Use in 127 Cities—93 Lines of Trade



New York Telephone Co.



Hanlon & Simpson

J. T. Castles Ice Cream Co.

Hotel Benson

More Light Delivery Trucks Sold Than All Others Combined

More light delivery trucks were sold last year than all other capacity trucks combined. The era of motor delivery is here. Leading business houses everywhere are rapidly adopting motor delivery because motor delivery saves time, money and labor, serves a wider territory, brings new business, makes satisfied customers, and advertises the merchant as progressive.

Lowest Operating Cost

Actual operating figures covering a period of three years prove that the Stewart delivery truck **costs less to operate** the year around than any other delivery truck. Our sale of repair parts last year averaged but $1.37 per truck. A fleet of six Stewarts owned by the Buffalo Evening News, Buffalo, N. Y., averaged 11,257 miles each last year. Gasoline, tires, repairs, oil and grease averaged but $1.33 per day per truck.

One-Third of Our Business Consists of Re-Orders

Such companies as the following, since making their initial purchase, have bought **more** Stewarts:

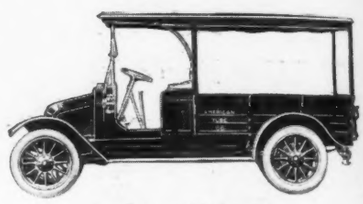
Bell Telephone Co.	New York City and Buffalo
Coca-Cola Co.	Atlanta, Ga.
Providence Gas Co.	Providence, R. I.
Water Works	Newark, N. J.
Buffalo Evening News,	Buffalo, N. Y.
Buffalo Times	Buffalo, N. Y.
Bonwit-Teller & Co.	New York City
Iten Biscuit Co.	Omaha, Neb.
Beck Brewing Co.	Buffalo, N. Y.
Wagner Pastry Co.	Newark, N. J.

Southern New England Tel. Co., Bridgeport, Conn.

Experts Recommend Them

Engineers and automobile men will tell you that the mechanical parts used in the Stewart are the best known to the automobile industry. Nothing better can be purchased. These mechanical parts, coupled with our design and construction, are reasons for the great success of the Stewart—reasons why half of our business, for instance, is coming from concerns who have grown motorwise on other delivery trucks. Catalog and booklet, "How Motor Delivery Pays," free on request.

Stewart Motor Corporation
Buffalo, N. Y.



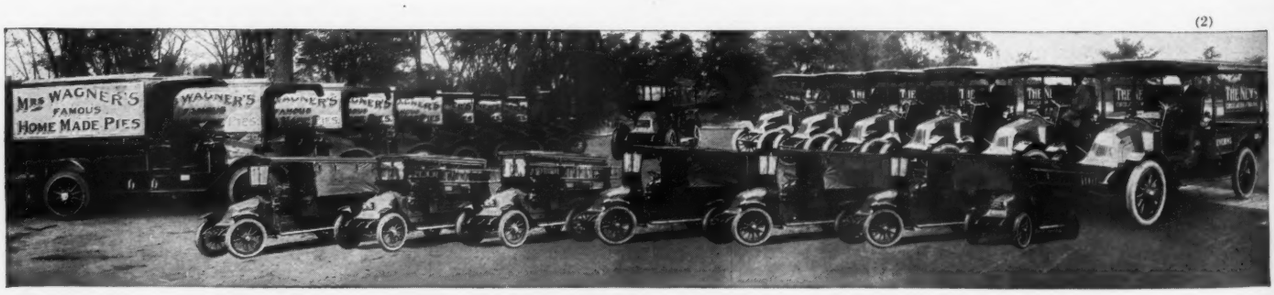
American Tube Co.

Iten Biscuit Co.

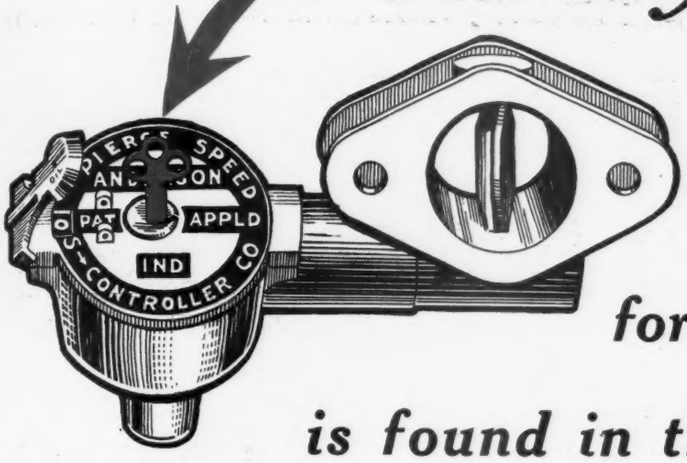
Drake & Phillips Grocery Co.

Jennings Oil Co.

(2)



Stewart owners buy more and more Stewarts all the time. Here are shown portions of the large fleets owned and operated by just a few big owners



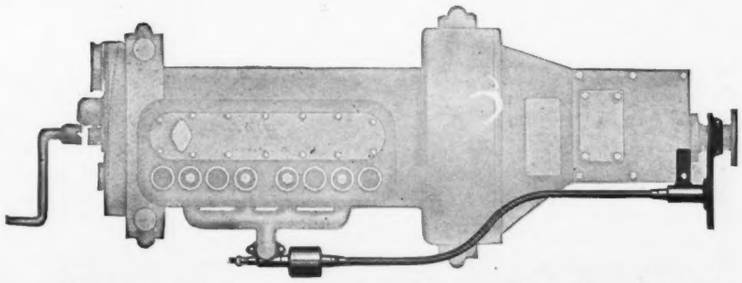
The Key to the Speed Problem

for motor truck users

is found in the

Pierce SPEED CONTROLLER

Put a PIERCE on each of your trucks and you are not dependent upon the skill or judgment of your drivers for the maintenance of a proper speed.



Showing Application of New, Transmission-Driven Pierce Speed Controller, Model G

This device does not interfere with the speed of the motor or the adjustment of speed to individual requirements, but it does limit the speed of the truck to the rate which you wish to be its maximum. You set this limit and lock and seal the controller and send your trucks forth knowing they will not overspeed.

This means a more economical operation of your trucks, less liability to accidents and longer life.

PIERCE SPEED CONTROLLERS are either transmission-driven or operated from the front wheel, as you may prefer. Hundreds of big concerns use one type or the other on their trucks and experience complete satisfaction.

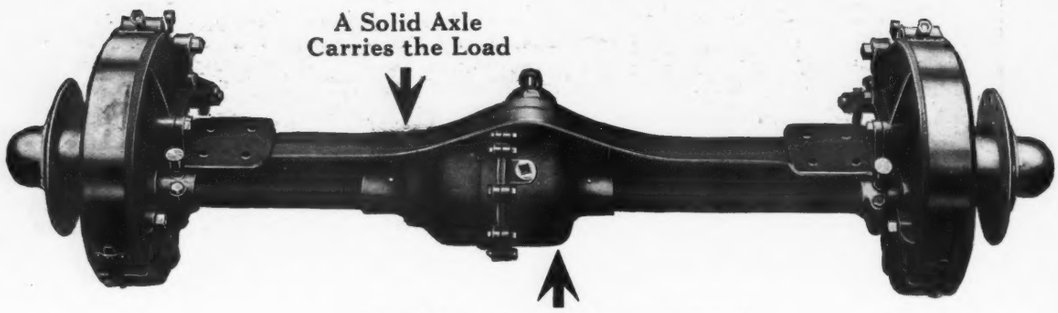
Send for illustrated booklet and prices

The Pierce Speed Controller Company

Anderson, Indiana, U. S. A.

Originators of Speed-Controlling Devices for Gasoline-Driven Cars

TORBENSEN
INTERNAL GEAR DRIVE
AXLES



Strength without excessive weight—Lightness without weakness

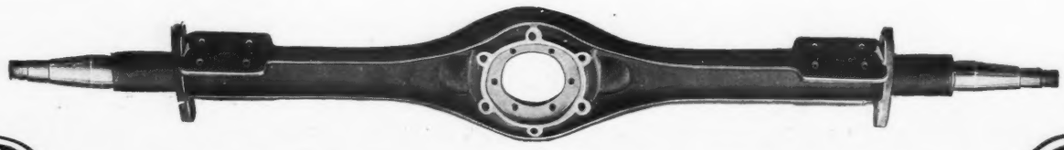
Here is a most sought after feature in motor truck construction—yet one impossible to obtain where one member must both carry the load and transmit power. Either strength is secured by adding enormous dead weight or light weight is obtained at the expense of durability.

The TORBENSEN is best because it *does* give strength without excessive weight and light weight without structural weakness.

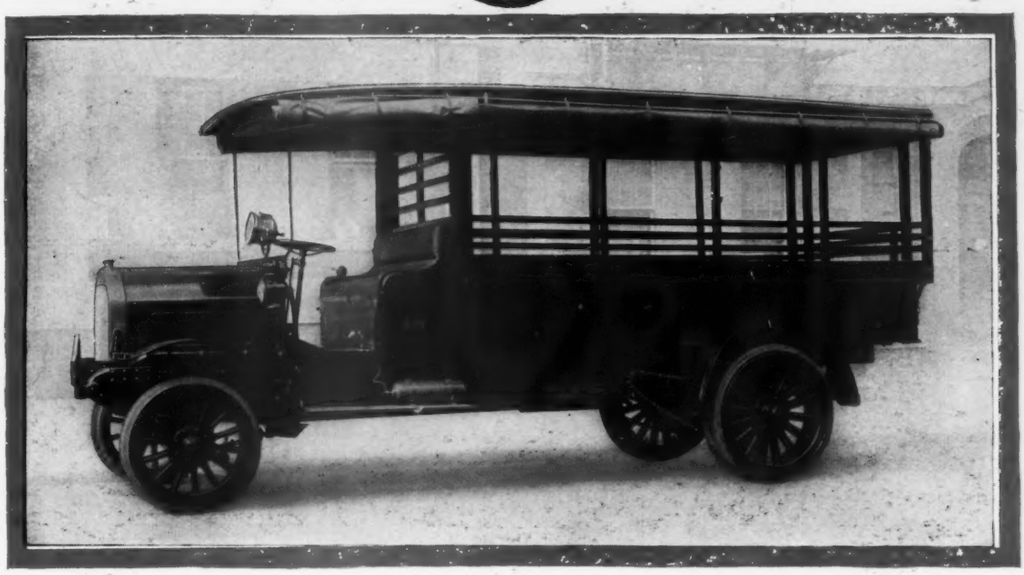
In the TORBENSEN construction two members, each with its specific duty, are combined in one axle which excels all other types in strength, durability, economy and efficiency in power transmission.

The sturdy drop-forged I-beam member shown below carries the load. Attached to it, as shown above, is a live axle whose sole function is to transmit power. This is delivered to the wheels, where the final and main reduction takes place by means of a driving pinion and an internal gear.

Among the many advantages of this construction are—all moving parts enclosed, long life, silent operation, great efficiency, lighter weight, low operating and maintenance cost. Let us prove its desirability for your trucks.



Torbensen Gear & Axle Company
216 to 228 High Street Newark, N. J.



MACK TRUCKS *for* PRODUCE DEALERS

FARMERS, Commission Merchants, Cold Storage Plants—all are finding that they can handle a larger volume of their product in less time with trucks.

For many Long Island farmers, Mack trucks are replacing 5 horses, one extra man, and in addition saving 12 hours on each trip to market.

Commission Merchants and Cold Storage Plants are using Macks and are hauling twice the tonnage in one half the time.

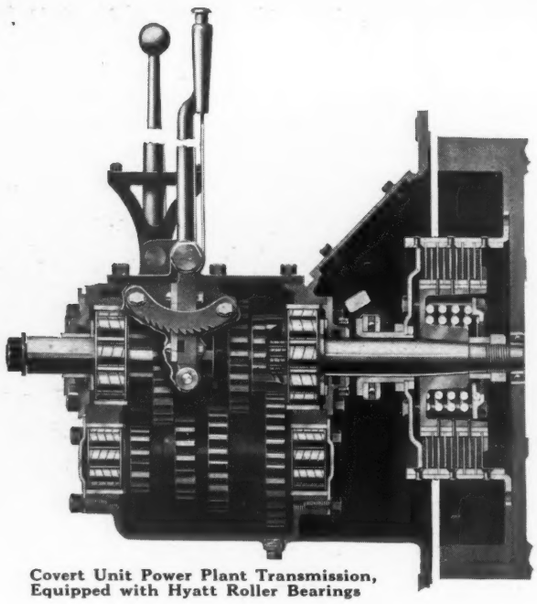
That is why Macks have such a big market in the produce field. The real saving value of Macks is being proved every day. Every handler of produce is a good prospect for dealers in Mack Trucks.

We are issuing at regular intervals carefully prepared literature to assist our dealers in following up prospects in these and other lines. Tie up with the Mack line and realize on some of these prospects.

INTERNATIONAL MOTOR COMPANY

64TH STREET & WEST END AVENUE, NEW YORK CITY

HYATT ROLLER BEARINGS



Covert Unit Power Plant Transmission, Equipped with Hyatt Roller Bearings

In Truck Transmissions

The bearings in a motor truck have to stand a lot of punishment—particularly those in transmissions. The very nature of truck service makes the transmission bearing duty very severe.

Hyatt Roller Bearings are the only bearings that have flexible spiral rollers. These rollers keep gears and shafts in alignment—cushion road shocks, relieve the surrounding mechanism of undue strain and absorb vibration.

On account of the "care free" service they render, Hyatt Bearings are used by most of the leading motor truck and pleasure car manufacturers.

HYATT ROLLER BEARING CO.
DETROIT CHICAGO
NEWARK, N.J.

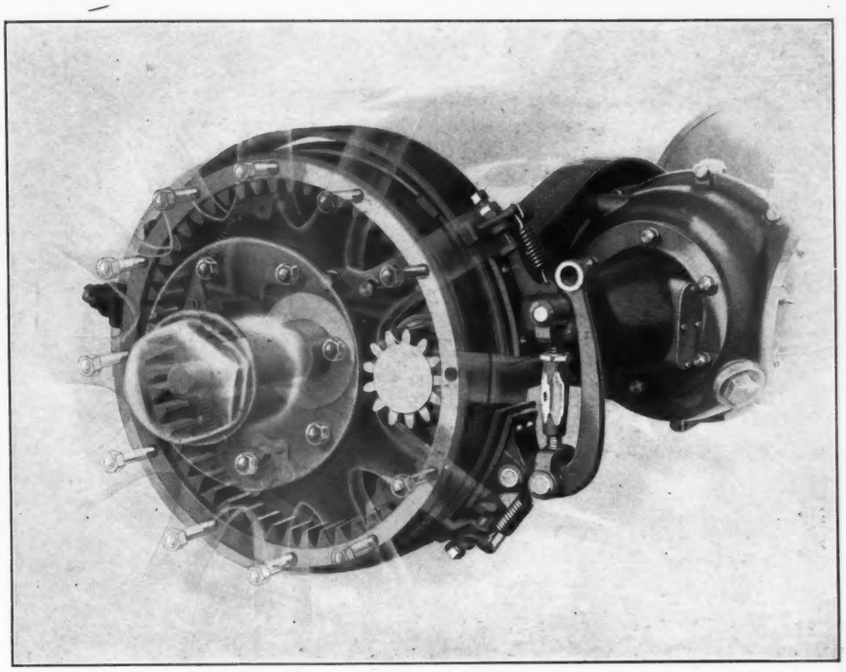
When Writing, Please Say—"Saw Your Ad. in the C C J"

Celfor Axles

INTERNAL GEAR DRIVE

Absolutely Quiet, Light in Weight and Efficient

Power is applied to the wheel at a considerable distance from its center, similar to the rear sprocket on a chain drive.



Internal gears and pinions are the most efficient of all types of gears.

CELFOR AXLES are equipped with very large wide-face drop-forged internal gears and pinions, both with hardened teeth, thereby insuring long life and continued quiet running. They are thoroughly protected from all foreign matter by running in an enclosed chamber dust- and waterproof.

These features, together with the solid I-beam load-carrying axle, and a very rigid tubular live axle, both built into one unit, are some of the features of superiority of CELFOR AXLES.

All parts of CELFOR AXLES are made interchangeable by a complete equipment of special tools and jigs, thereby insuring abolute interchangeability of all parts.

Send for our catalog and prices on our 1, 2 and 3 ton Models.

Celfor Tool Company

BUCHANAN, MICHIGAN U.S.A.

Continental World-Wide

Prestige

CONTINENTAL MOTORS — Powerful as the Nation — AMERICA'S STANDARD

Motor trucks are uncommonly hard to sell. Every dealer knows that. There is no sentiment in the matter. The wife isn't consulted, and the children don't have a voice in the decision. Mr. Business Man does the buying, with the assistance of two or three shrewd heads of departments.

Continental Motors

In buying a truck only one thing is considered—to get the best for the money.

For this reason, a large proportion of the commercial vehicles purchased in this country must be Continental-equipped. The experienced business man is demanding it. For he knows there is nothing better, and the best is none too good. He will buy upon no other basis.

To sell thus upon **quality** is to have real **sales prestige.**

Such **prestige** is a predominating trait of Continental Motors.

For easier sales and permanent trade—for guaranteed motor-satisfaction—

Insist on a Continental

Continental Motor Mfg. Co.

Detroit, Michigan

Largest Exclusive Motor Builders in the World

Factories—Detroit
Muskegon

The 20% additional rubber incorporated in McGRAW SOLID TIRES

strikes the bull's-eye of truck economy

The greatest factor in truck-operating expense is tire cost. Keep that down and you make the greatest possible stride towards truck economy.

You can do it by using McGraw Tires. They are not only good tires that stand comparison with any other, but they are compounded and designed to save truck parts.

Each McGraw Tire contains 20% more rubber than any standard S.A.E. tire. Think of what that means! Under equal conditions of service, when the ordinary tire has worn out, the McGraw still has that 20% to fall back on.

As a matter of fact the E. C. McGraw Tires give 3,000 more miles of service than any other truck tire on the market.

Just think of what 3000 miles of service means in reducing your tire expense. It promotes economy in truck operation such as nothing else can. And that's the best argument that can be advanced for using any tire. Write for particulars.

The McGraw Tire & Rubber Co.

East Palestine **Ohio, U.S.A.**

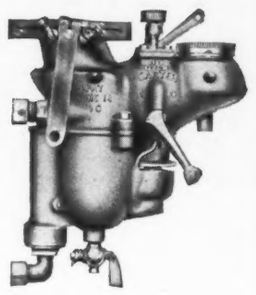
When Writing, Please Say—"Saw Your Ad. in the C C J"

Ever Think of how much Depends on your Carburetor?

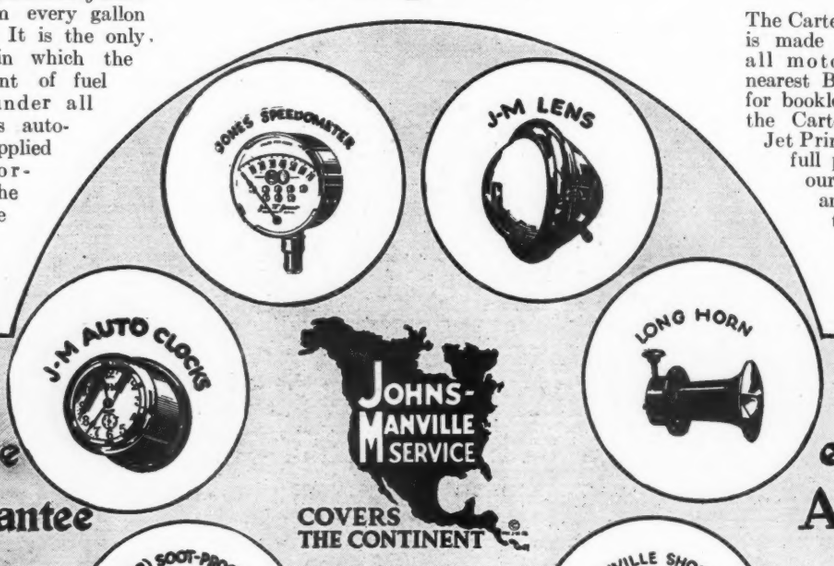
The efficiency of your motor—the power it develops, its speed and its flexibility as well as its economy in the use of fuel—all depend upon your carburetor. If your carburetor is not efficient your motor can't be.

The efficiency of the Carter Carburetor is measured in more power, more speed, better acceleration, perfect low throttle and *particularly* more mileage from every gallon of gasoline. It is the only carburetor in which the exact amount of fuel required under all conditions is automatically supplied and proportioned by the suction of the motor.

Carter Carburetor
Multiple Jet



The Carter Carburetor is made in sizes for all motors. Write nearest Branch today for booklet describing the Carter Multiple-Jet Principle and for full particulars of our liberal guarantee. Or see the J-M dealer.



One Firm
One Service
One Guarantee

back of every J-M Accessory

Quality in your brake lining means safety in your brakes.

And upon the safety of your brakes depends the safety of your trucks, your drivers and the public.

J-M Non-Burn Brake Lining
Economy Commends It
Safety Demands It

Common sense argues for care in the selection of your brake lining.

When you specify J-M Non-Burn you play safe. For J-M Non-Burn is backed by many years experience in the manufacture of brake linings for heavy industrial service, where the requirements are necessarily a great deal more severe than for motor truck service.

Let us send you our booklet, "Practical Pointers on the Care of Automobile Brakes." Write nearest Branch today.

3123

H·W·JOHNS-MANVILLE CO·

Akron, Albany, Atlanta, Baltimore, Birmingham, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Columbus, Dallas, Dayton, Denver, Detroit, Duluth, Galveston, Houghton, Houston, Indianapolis, Kansas City, Los Angeles, Louisville, Memphis, Milwaukee, Minneapolis, Newark, N. J., New Orleans, New York, Omaha, Philadelphia, Pittsburgh, Portland, Ore., Rochester, St. Louis, St. Paul, Salt Lake City, San Francisco, Seattle, Syracuse, Toledo, Washington, Wilkes-Barre, Youngstown

THE CANADIAN H. W. JOHNS-MANVILLE CO., LIMITED Toronto Montreal Winnipeg Vancouver

BESCO

STEEL WHEELS

Should be on your trucks

They should be used because they excel in

Strength
neatness
adaptability
completeness
cleanliness
giving service

Being true
climate proof
light weight
distributing strain
ease on tires
rapid acceleration

Besco Steel Wheels are made of electric-furnace Vanadium steel, uniformly heat-treated and cast in disc type. They are designed for standard S.A.E. Demountable Tires and possess features not found in other metal wheels. They have achieved remarkable success and have been extensively adopted by users of heavy trucks, including the U. S. and foreign governments.

We should like to go into the subject thoroughly with you and believe we can show you that Besco Steel Wheels will give better results than the wheels you are now using. Ask us to prove our case.

Electric-Furnace Castings

We also make a specialty of high-grade steel castings. Our electric-furnace equipment enables us to produce thin-walled and intricately designed castings such as cannot be obtained from fuel-melted furnaces.

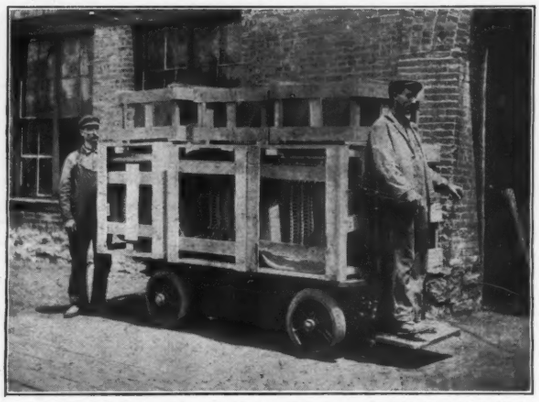
Put your requirements for this class of work up to us and you will be just as satisfied as are the many automobile concerns for whom we are now making them.

BUCHANAN ELECTRIC STEEL CO., Buchanan, Mich.

Originators and Designers of Cast-Steel Disc Wheels for Motor Vehicles

Electric-Furnace Castings

Originators and Designers of Double-Disc Pressed-Steel Wheels



This Industrial Truck, equipped with 20 cells of Type MV-11 "Ironclad-Exide" Battery, is used in the manufacturing plant of Pierce, Butler & Pierce Co. at Eastwood, near Syracuse, N. Y.

The "Ironclad-Exide" Battery For Industrial Trucks

The economy and efficiency of Industrial Trucks, operated by storage batteries, is rapidly bringing them to the attention of manufacturers.

As in other types of storage battery propelled vehicles, the cost of operation and the service procured are to a great degree dependent upon the battery with which trucks are equipped.

The "Ironclad-Exide" Battery, now in its fifth year of successful service, has been very widely used in both commercial and pleasure electric vehicles with most satisfactory results.

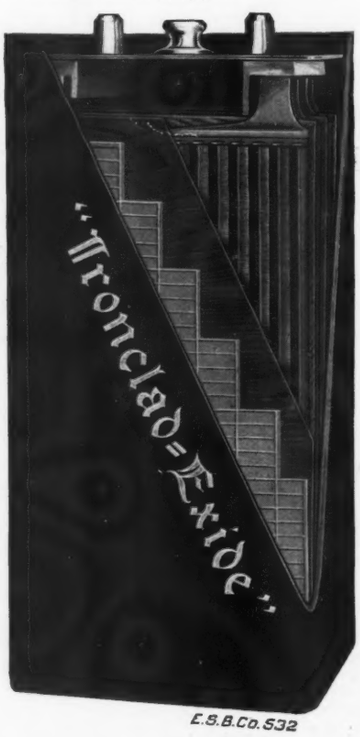
It is unquestionably the battery for Industrial Trucks. It is reliable — day in and day out — every day in the year. No delays — no fuss — no inconveniences — always dependable.

It is the battery for big loads and hard service. It hauls the most for the longest time with the least trouble and at the least expense.

It is economical to use and economical to maintain. It's good when new and it stays good. It's a business battery for business men.

It is used by the largest electric vehicle users in the country.

Our office near you will be glad to furnish further information.



E.S.B.Co.532

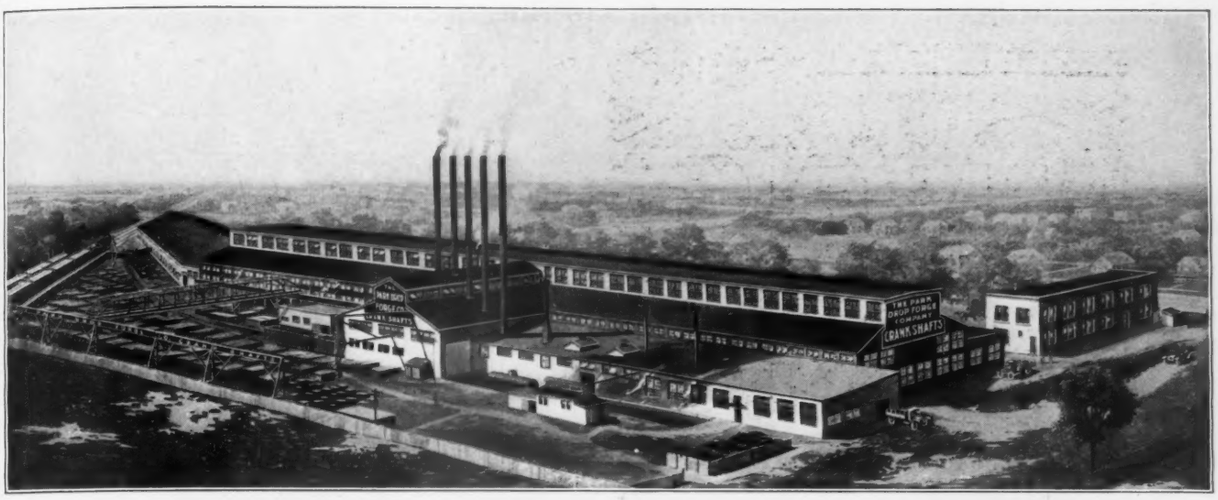
The illustration shows a Type 7-MV "Ironclad-Exide" cell with wood separator, negative plate and rubber jar cut away to show construction. The positive plate consists of metal top and bottom bars, connected by a series of conducting rods, each surrounded by active material, protected and held in place by horizontally laminated hard rubber tubes.

THE ELECTRIC STORAGE BATTERY CO.

1888 **PHILADELPHIA, PA.** 1915

OFFICES

Philadelphia	Boston	St. Louis	Atlanta	Detroit	Washington	Los Angeles	Seattle
New York	Pittsburgh	Chicago	Cleveland	Denver	Rochester	San Francisco	Toronto



THE FIREPROOF HOME OF PARK CRANKSHAFTS

TRUCK AXLES—HEAVY DIE FORGINGS

CRANK DROP PARK FORGED SHAFTS

39 Large Hammers and Hydraulic Forging Presses, Chemical and Physical Laboratories, 16 Furnace Heat-Treating Plant

Large Stock Classified Steel—Analysis Checked in Park Laboratory

"Park Forgings" always have been guaranteed as to Chemical Analysis, Physical Properties and Bearing Hardness

CRANK DROP PARK FORGED SHAFTS

THE PARK DROP FORGE CO., CLEVELAND, OHIO

FAFNIR BALL BEARINGS

The supreme test of a ball bearing is indicated by its ability to command repeat orders.

Users of FAFNIR BALL BEARINGS are confirmed customers.

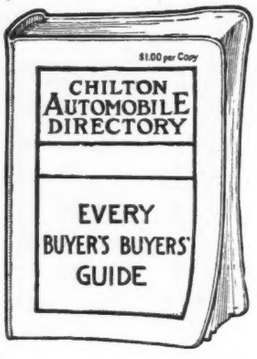
Catalog on Request

The Fafnir Bearing Co., New Britain Connecticut

Order Now!

The 1915 Chilton Automobile Directory

$1.00 a Copy



Order your Directory at once

Every Manufacturer, Jobber, Dealer, Engineer and Purchasing Agent needs this "Directory" for daily reference.

It contains the correct name and address of every Manufacturer and National Jobber making or selling anything in the Automobile Industry; also valuable Engineering data, formulae, S. A. E. standards, etc.

Bound with flexible Fabrikoid leather for easy use.

Send us your dollar. The issue will be fully subscribed, and ***you*** need the "Directory" —so don't miss it.

CHILTON COMPANY
Market and 49th Sts. Philadelphia, Pa.

Another FEDERAL Endorsement

MARK NABORS & COMPANY

MOTOR TRUCK SPECIALISTS

GARFORD 2 TO 10 TONS | FEDERAL 1 1-2 TONS | REPUBLIC 1 TON

506 WHITEHALL

PHONE MAIN 329

ATLANTA, Sept, 30th, 1914.

Federal Motor Truck Company.

Detroit, Michigan.

Gentlemen:-

Replying to your recent communication concerning the upkeep of Federal Trucks, advise that we have twenty five Federal trucks in operation in our territory, some of which have been in service for over two years.

We will put the FEDERAL in service against any make of trucks in the United States, based on a five year operation in any kind of service. It will cost less to operate, will lose less hours for repairs, than any ton and half truck manufactured in America regardless of price.

We have been handling the FEDERAL for over two years, and have found it to be a truck that any firm can absolutely depend on making their deliveries as dependable, and at as little cost of upkeep as is possible for deliveries to be made.

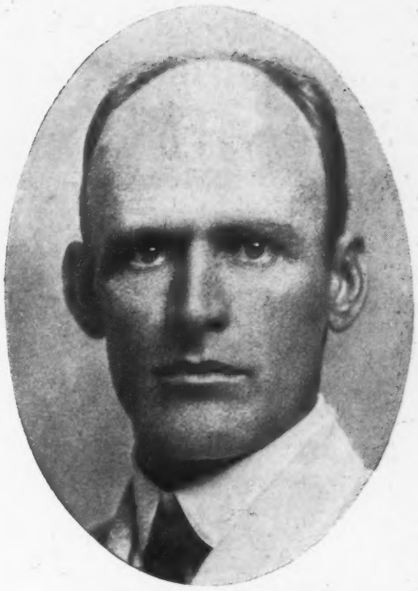
From a point of selling, we consider that no better asset can be added to an agent's business that the FEDERAL ACCOUNT, and when I make this statement, I am speaking from six years of experience in the business, having represented fifteen different makes of cars and trucks.

If I said more, it would only be elaborating on the good qualities of FEDERAL TRUCKS. Trusting that I have voiced my sentiments on the Federal subject, I am with best regards,

Yours very truly,

Mark Nabors

MH/DB



MARK NABORS
Mark Nabors & Company
Atlanta, Ga.
Federal Distributors

"We will put the Federal in service against any make of truck in the United States . . . . . from a point of selling, we consider no better asset can be added to an agent's business than the Federal account."

These two statements explain the great success of the Federal—the truck itself gives the use—service that makes it an easy seller for the dealer who is backed up by the entire Federal organization.

From the user's and from the dealer's standpoint the Federal has shown itself in a class by itself—the truck that is "delivering the goods" all over the world.

Dealers in open territory will find it greatly to their advantage to get in touch with us at once.

1½ ton worm and chain drive and 3½ ton worm drive chassis.

"Investigation Means Federalization"

FEDERAL MOTOR TRUCK CO.
112-120 LEAVITT STREET
DETROIT, MICHIGAN

Be sure and see the Federal Exhibit in the Transportation Palace at the Panama Exposition

New ½ Ton Worm Drive

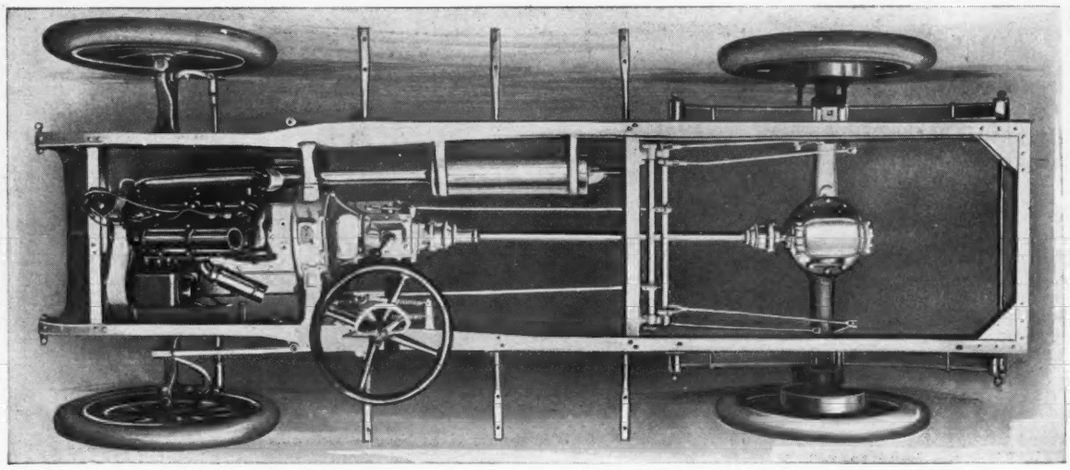
Electric Starting and Lighting System
Regular equipment. Electric signal and lamps.

Frame
Special truck type.

Springs
High-carbon steel. Truck type. Semi-elliptic. Suspension is truck design, not pleasure-car design.

Tires
Extra large, 33 x 4. Firestone, pneumatic.

Motor
25 H. P., 3¼ x 5", long stroke. Special truck type.



Transmission
Three speed forward and reverse. Selective type. Nickel-steel gears.

Timken Axles and Bearings
"I" beam, front; special truck type, rear. Timken Roller Bearings throughout.

Worm Drive
Timken-David Brown (We are worm-drive leaders again).

Radiator
Back of hood for safety and efficiency.

Fender
Crown shaped

The Economical Car to Run

Too many owners are wasting money either through expensive upkeep of rebuilt pleasure cars or by operating cars of overcapacity.

We have built this new, light, fast delivery car with worm drive, special truck frame, and spring suspension, to stand up under continual service and operate on minimum expense.

It has the excellent appearance you will notice in all Lippard-Stewarts.

Business Men: Let us tell you the years of economical service our cars have given fleet-operators as well as small retail operators. Tell us about your delivery problems.

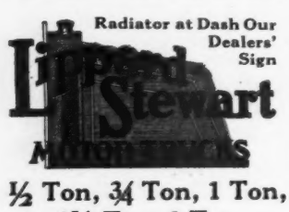
This new ½ Ton Model was ordered by users of Lippard-Stewarts in larger capacities even before our specifications were finished.

Catalog and Special Truck Information on Request

Lippard-Stewart Motor Car Co.

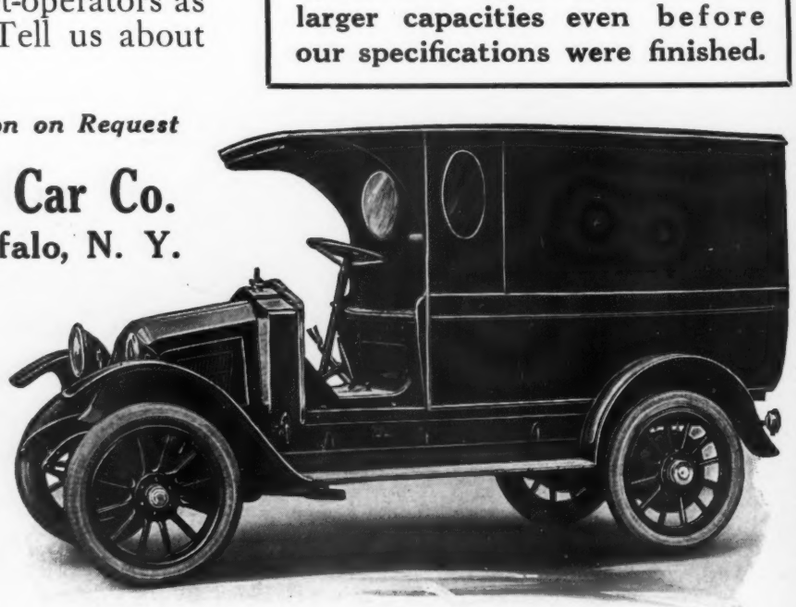
237 West Utica Street, Buffalo, N. Y.

New York City: Lippard-Stewart Motor Sales Co.
Chicago: Ropp Motor Co.
Boston (Cambridge): A. W. Cox & Co.
Pittsburgh: Vulcan Motor Truck & Service Co.
Cincinnati: Pullman Motor Car Co.
Dealers' Service Stations in other Leading Centers



½ Ton, ¾ Ton, 1 Ton, 1½ Ton, 2 Ton

DEALERS:
Our ½ Ton Model opens up a new field. Our line gives you an opportunity to be a leading dealer.
Write us for proposition.



All Truck Tire Money Back

If a Goodyear S-V Fails to Meet This Test

We are ready now—after 5000 careful tests—to issue this defiance to all other Truck Tire claims.

We shall not merely argue that Goodyear S-V's excel every rival Truck Tire. We shall *guarantee* it in this convincing way.

Equip opposite wheels—at the same time—one with a Goodyear S-V, one with any other standard Truck Tire of like rated size, bought in the open market.

If the Goodyear S-V fails to cost less per mile than the other, we will return you its full purchase price, making the S-V free.

This offer is unlimited as to number of tires. Equip as many wheels as you wish under these conditions. Sign with us the proper blank when the tires go on.

But it is limited to tires bought in April, May and June. It is simply to show you, in a vivid way, that Goodyear now outranks all others in this line. Our regular mileage guarantee applies to these tires, in addition.

Accept this challenge. Let us prove, at our complete risk, that Goodyear S-V's will cut down your tire bills.

Why We Dare Do That

This means in three months a tremendous stake, and against the entire field.

But we have spent 8 years perfecting this Truck Tire. Scores of experts have worked on it. They built 29 types in their progress toward this one. Then they built 74 structures to attain the utmost in this type.

Our offer is based on records of 5000 test tires. And on side-by-side tests with rivals under all conditions. We know that none can stand up with S-V's.

The Reasons

We give you 20 per cent more available tread rubber.

We give you a shape which ends bulging or breaking by distributing heavy loads equally. And a shape which saves grind.

By a secret method, we weld the soft rubber tread, the hard rubber backing and the steel channel base into a life long union.

We press the tires on—in 5 or 10 minutes—at a minimum of 50,000 pounds. Thus they cannot creep. In this tire there is no auxiliary fastening whatsoever.

We give you a compound which saves undue friction, taxing tire and power.

This new Goodyear S-V appears to us the limit in a Truck Tire. Certainly it excels any rival production. We are staking on that fact the whole price of the tire.

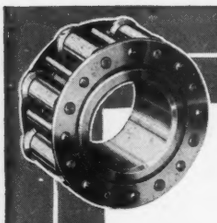
We invite every truck owner who wants to end tire troubles to let us show him the way at our risk. Consult your dealer or our nearest branch.

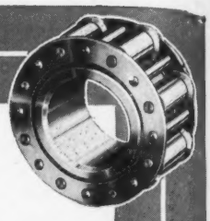
GOODYEAR
AKRON, OHIO
S-V Truck Tires

THE GOODYEAR TIRE & RUBBER CO., Desk 94, Akron, Ohio

Makers of Goodyear Automobile Tires

We Make Demountable, Block, Cushion, Pneumatic, and Other Types of Truck Tires (2313)





[One Bower Bearing cannot differ from another by 1/160 the thickness of the white line in the border

The Problem of Adjustment

To make a bearing accurate to within limits of $\frac{2}{10,000}$ inch, as Bower Bearings are made, is not enough. This accuracy must be maintained.

Adjustments on bearings, made in the ordinary garage or repair shop, with ordinary tools, can be accurate only by accident. But Bower Bearings are adjusted radially at the factory by experts, with special delicate instruments. Thus their accuracy is determined once for all, and it never needs correction by adjustment.

Bower

Roller Bearing Co.
Detroit, Mich.

Write for complete information and list of users

When Writing, Please Say—"Saw Your Ad. in the C C J"

GMC
GENERAL MOTORS COMPANY
TRUCKS

The old way *The new way*

The Better Way

Down on the levees of some of our

southern cities big GMC Electric Trucks have begun to replace the oxcart in handling giant cotton bales. A usual load for a three team oxcart is 8 bales. The GMC Electric carries 24 five-hundred pound bales in one load. It does the work better and at less cost.

This unusual application of motor

haulage illustrates the varied kinds of service in which GMC Trucks can be profitably used. The comprehensive GMC line includes gasoline trucks from 1500 lbs. to 5 tons in capacity and electrics from 1000 lbs. to 6 tons—a truck for every business need.

You can secure active cooperation

in the solution of *your* haulage problem from the nearest GMC dealer or from our factory direct.

GMC Trucks are on exhibit in the Transportation Building, Panama-Pacific Exposition, San Francisco

GENERAL MOTORS TRUCK COMPANY

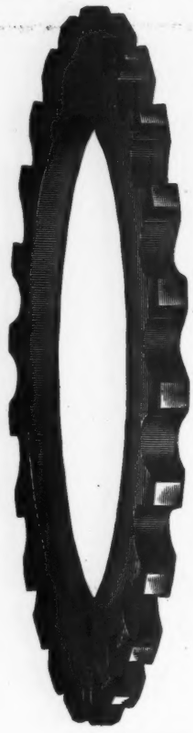
One of the Units of General Motors Co.

Pontiac Michigan

Direct Factory Branches:

New York Boston Chicago Philadelphia St. Louis Kansas City San Francisco

(3)

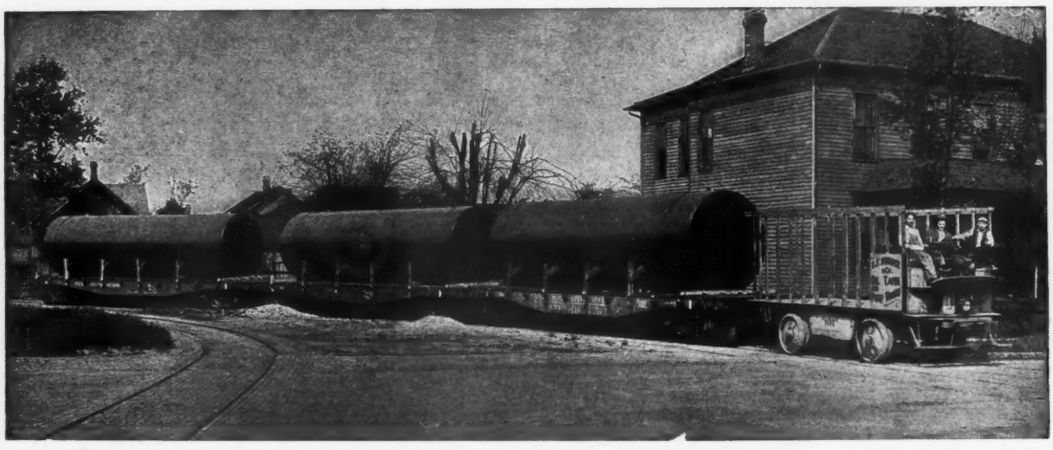


CULLMAN SPROCKETS and Differentials

in stock and to order.

Send for catalog and let us quote you on your requirements.

CULLMAN WHEEL COMPANY, CHICAGO
1351 GREENWOOD TERRACE



Gentlemen:—

I am sending you print showing one of your Trucks hauling three cars loaded with 12,000 gallon tanks. I have never had trouble with either of the two trucks in service here. I have always kept them adjusted and well oiled and they run fine. I have pulled seven cars at one time with one truck, four loaded and three empty, which I think is a good test.

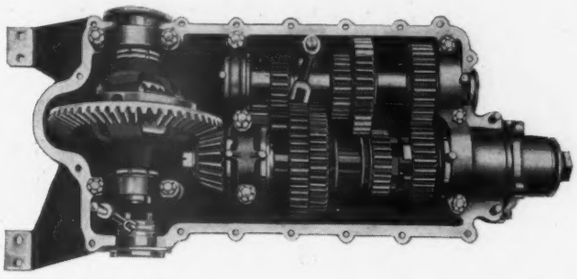
Yours truly
JOHN F. DETRO
Operator for
S. F. Bowser Co.

To Users of Trucks: The truck having this record and capacity should interest you because of the big money it will save on your transportation and haulage costs. If it does, let us figure on your requirements.

COUPLE-GEAR FREIGHT-WHEEL CO., 420 Buchanan Ave., Grand Rapids, Mich.
Boston, 541 Tremont Street — New York, 30th Street and 11th Avenue — Philadelphia, 522 Weightman Building

4-Wheel Drive **COUPLE-GEAR TRUCKS** **4-Wheel Steer**

When Writing, Please Say—"Saw Your Ad. in the C C J"



Unparalleled Service in Every Gear

The Dominating Factor in the Truck Field

Warner Gear Co. Transmissions

High-grade transmissions for every service

WARNER GEAR COMPANY
MUNCIE, INDIANA

Detroit Office **967 Woodward Avenue**

THE BUDA COMPANY
BUDA MOTOR
"The part to buy the car by"
ESTABLISHED 1881

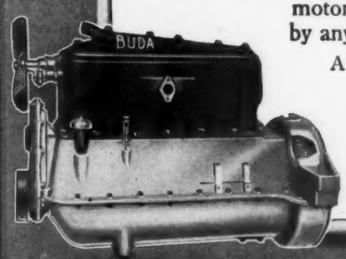
Performance - Not Price

"PERFORMANCE—not price" has always been the Buda watchword. We have always striven (successfully, as you know) to keep our eyes on "the motor first—the price afterwards." The result is a motor unexcelled by any, at a right price fair and ready to meet fair competition.

ANY CAR OR TRUCK MANUFACTURER who does not KNOW this (not just "guess so") will confer on himself a benefit and on us a favor by asking us for data.

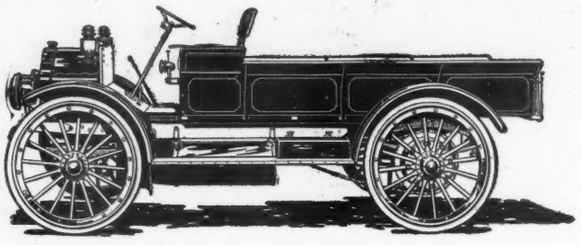
Address BRANDENBURG & COMPANY, Facty. Reps.
57th & Broadway, N.Y. 1108 S. Michigan Ave., Chicago 1311 Dime Bank Bldg., Detroit

"If the MOTOR is not right, the car is wrong."



THE BUDA COMPANY, HARVEY CHICAGO SUBURB ILLINOIS.

Buy an International Motor Truck



A light truck for speedy deliveries and light hauling is very probably what you will buy, because that's the kind of truck best suited to 80 per cent of business.

When you come to buy, whatever else you do, get a truck that is made and backed by responsible parties who are likely to stay in business until your truck is worn out. Find out these things about the truck you buy:

1. **Is it doing good work for firms in your line of business?**
2. **What kind of service can you get from the Company?**
3. **What is the Company's financial standing?**

You will get satisfactory answers to all of these questions when you ask about the

INTERNATIONAL MOTOR TRUCK

Model E, 1500 lbs. capacity **Model M, 1000 lbs. capacity**

It is doing good work for firms in nearly 200 different lines of business. Service on repairs and parts is the best in the country. There is no question about the Company's staying in business and taking care of you until the truck is worn out, even though it should last a lifetime.

There is no safer, better buy for you than an International Motor Truck. Write for catalogues and full information to

International Harvester Company of America

182 HARVESTER BUILDING **(Incorporated)** **CHICAGO U S A**

"The Spring Is the Thing"

MATHER SPRINGS

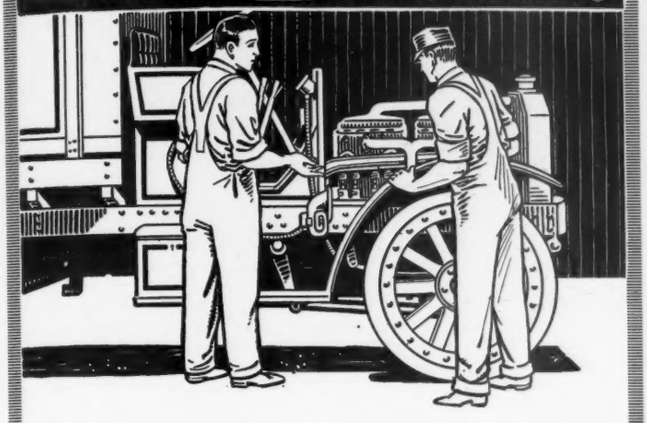
Scientifically Heat-Treated

Genuine made only by

The Mather Spring Company

Toledo, Ohio

Look for the name LEAK-PROOF stamped on the Ring



The Cost of Carbonization

CARBON deposit is more than merely an annoyance. It is an evil—and an expensive one.

¶ It prevents proper seating of valves and causes piston rings to stick—result, poor compression and wasted power. It causes pre-ignition of the fuel charge and premature explosion that entails severe strain upon the crank-shaft bearings.

¶ Carbon deposit is caused by incomplete combustion of the fuel charge and by the burning of surplus lubricating oil in the cylinder head. The only cure for both such conditions is

LEAK-PROOF

MADE IN ALL SIZES **Piston Rings** EASILY ADJUSTED

Made by McQuay-Norris Mfg. Co.

¶ They make full compression certain and prevent all passage of oil, because the mechanical perfection of their design ensures proper and continuous bearing on the cylinder. They have no unsealed openings like the ordinary ring, nor the unequal tension of either the eccentric or concentric one-piece ring, nor the weakness of the multiple-piece ring.

¶ LEAK-PROOF Rings are simple, strong, wonderfully elastic—easy to adjust. Each ring is composed of two concentric "L" shaped sections closely interlocking—this is the patented and individual LEAK-PROOF feature. The perfect fit and finish of every ring ensures the minimum of cylinder wear.

When your car is overhauled have LEAK-PROOF Piston Rings installed.

Send for FREE Book—"To Have and to Hold Power"

It explains the theory and function of piston rings. It tells about the LEAK-PROOF **Ring** and why every motor should be equipped with them. How it will pay you in fuel economy and prolonged motor life. Write for it.

"Ask the User"

In use on over 300,000 Motors

Angle to angle interlocking construction identifies LEAK-PROOF—insist.

Sold by all up-to-date supply houses, garages and repair shops.

Manufactured by

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Chicago—Suite 718 Michigan Blvd-Bldg., Michigan Ave. and Washington St.
Los Angeles—224 Central Bldg.
Dallas—509 Juanita Bldg. 5-T

Theres no leak proof ring but the LEAK-PROOF Ring — insist

Best for Motor Trucks

With Worm-Drive Construction

TUTHILL'S TITANIC SAFETY-FIRST

Guaranteed Forever Against Center Breakage

Unless you are using Tuthill Titanics as standard equipment, you should, to insure getting the maximum service from your motor trucks, either equip each truck with a "spare" front and rear Tuthill Titanic, or have them in stock ready for any emergency.

Engineers have condemned the old-style, center-bolt springs for use on motor trucks with Worm-Drive Construction, because the additional strain of such construction causes the center bolt to shear and the spring to break at the center.

Tuthill Titanics have NO CENTER BOLT and are guaranteed forever against center breakage.

Write today to our Engineering Dept. for Motor Truck Spring Facts.

Tuthill Spring Company

774 Polk Street, Chicago, U. S. A.

Kelly-Springfield

Tires for Commercial Vehicles

For maximum mileage at minimum cost, equip your trucks with Kelly-Springfield sectional Block Tires on the rear wheels, and Kelly-Springfield Pressed-On or Demountable endless Tires on the front wheels. This is the ideal tire equipment for commercial cars. It will deliver record mileage even under unusually severe service conditions.

Kelly-Springfield Tire Company
Akron, Ohio
BRANCHES IN ALL PRINCIPAL CITIES

Veeder
HUB ODOMETER

Here is a little device that is essential to the economical operation of your trucks.

It tells you that which it is absolutely necessary to know in order to properly figure costs—the exact mileage covered by the truck.

Please note that this is not recorded mileage, but actual mileage. There are abundant instruments which record mileage, but which can be so juggled or tampered with as to make the record worthless.

The VEEDER is NOT that kind of an instrument. It tells the truth and nothing but the truth. It cannot be made to register falsely. Drivers cannot tamper with it. It is fool-proof and crook-proof.

The VEEDER is needed by every truck owner who is disirous of getting the most service from his trucks at the least cost. It will be worth many times its price of $20. Send for our booklet describing the VEEDER.

THE VEEDER MANUFACTURING COMPANY
10 Sargeant St., Hartford, Conn.

Makers of Cyclometers, Odometers, Tachometers,
T. H. CRANSTON & CO.
56 E. Randolph St., Chicago

Tachodometers, Counters and Small Die Castings
BERNARD I. BILL
543 Golden Gate Ave., San Francisco, Cal.

15% Reduction in Automobile Fire Insurance Premiums

So well satisfied are the Insurance Companies with the QUALITY of fire protection furnished by PYRENE, that they have made this reduction in the cost of a policy on a Pyrene protected car—the Aetna Accident and Liability Company and the Automobile Insurance Company, of Hartford, Conn., having led the way.

Hardly an hour passes, without an automobile or a garage being saved, *somewhere*, by a Pyrene Fire Extinguisher.

Despite the greatest care, explosions and fires are caused by gasoline and grease.

Pyrene extinguishes such flames before they spread, and does not injure the most delicate engine parts, the finish or upholstery.

The extinguisher harmonizes with the finest type of dashboard equipment.

Brass and Nickel-plated Pyrene Fire Extinguishers are included in the lists of Approved Fire Appliances issued by the National Board of Fire Underwriters, and are Inspected, Tested and Approved by, and bear the label of, the Underwriters' Laboratories, Inc.

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Aberdeen, S. D.	Bridgeport	Cleveland	Louisville	Pittsburgh
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Atlanta	Charlotte, N. C.	Detroit	New Orleans	Salt Lake City
Baltimore	Charleston, W. Va.	Duluth	Oklahoma City	San Antonio
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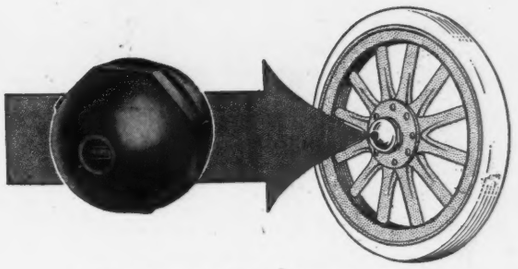

"Dreadnaught" Type Transimeter, $20

You can save money in truck operation by keeping Mileage Records.

And you can get better and easier Mileage Records by using the

TRANSIMETER

(Hub Odometer)

Built *for* practical men *by* practical men who know the working conditions of truck operation.

Built to get accurate mileage records, and to get them easily and inexpensively.

Guaranteed Indestructible

The heavy cast housing prevents injury to mechanism from collision. No money lost on smashed instruments.

Grease- and Dirt-proof

Special construction prevents oil or grease leaking from axle penetrating to inside of glass window. Figures are always clearly legible.

Easy to Read

Figures remain stationary and upright—always easy to read. No danger of error.

Let us send you our booklet telling more about this practical and efficient hub odometer.

AMERICAN TAXIMETER COMPANY

Mfrs. of Jones and Popp Taximeters and the Recordograf

Seventh Ave & 49th Street New York City

Service stations in the following cities:

San Francisco New Orleans Washington Chicago Detroit Philadelphia Seattle St. Louis Boston

Troy Trailers

Cutting Hauling Costs 35 Per Cent

Two Troy Trailers in the service of The Motor Truck & Terminal Company, of Los Angeles, have practically doubled the tonnage of two trucks that pull them.

Trucks carry five tons, Trailers four tons each. Gasoline expense 10 per cent. greater than truck alone. No other additional costs.

Three thousand miles with no repairs, at a ton-mile saving of 35 per cent.

Troy Trailers made in three sizes, reversible or non-reversible, rubber or steel tires, all kinds of bodies.

Send for Troy Trailer Booklet No. 4 CCJ

The Troy Wagon Works Company

Troy, Miami County, Ohio

New York	Detroit	Philadelphia	London, England
50 Church St.	319 Hammond Bldg.	702 Abbott Bldg.	49 Pall Mall

A Shim Is—

As Necessary as a Wrench

Motor truck service is hard. Bearings frequently require adjustments. Shims are thus as necessary in the shop as a wrench. Make your shims from

LAMINUM
The MATERIAL for SHIMS

and you'll save time, trouble, labor and expense. Don't waste time filing a solid shim! Don't fool with troublesome loose-leaf shims! Don't waste money on new shims! Be economical. Be practical. Save time, labor, expense. Use LAMINUM! It's the work of a moment—just peel off with your knife enough of these .002" laminations to get the desired thickness. Result—a smooth surface, uniform thickness, perfect adjustment, an unspoiled bearing surface—a first-class job with little work or cost.

LAMINUM comes in various forms and thicknesses. We put up a trial assortment that will just suit you. Write for prices and data.

Laminated Shim Company, Inc.
539-41 Canal Street - New York

RYERSON REINFORCED
GLYCO PATENTED SKELETON CONSTRUCTION
BEARINGS

for automobile, motor boat, tractor and stationary gas engines and other machinery where a removable and quickly replaceable bearing is desired.

Finished Bearing

A reinforced Babbitt bearing embodying enormous **strength** and **resistance.** A steel or bronze skeleton embedded in the **Babbitt** changes weakness to strength — just what steel reinforcement does to concrete.

Section showing reinforcement

Reinforced and interlocked throughout body and flanges —skeleton and Babbitt one homogeneous mass.

Demand Ryerson Reinforced Bearings in those vital parts of your engine—the connecting rod and main shaft bearing. The whole engine is no stronger than its weakest part. Inferior bearings make an inferior engine.

Steel or bronze skeleton, used in combination with whatever Babbitt metal is preferred.

JOSEPH T. RYERSON & SON
Iron Steel Machinery
Chicago New York St. Louis

B-A-Gramm's Trucks

appeal to the man who has had experience in the use of motor trucks.

To him their quality points, the individual clutch transmission, guaranteed springs, self-starter, etc., mean a definite saving in operating costs.

The full line, 1 to 6 tons, with all its features, is described in our complete catalog, which will be sent you on request.

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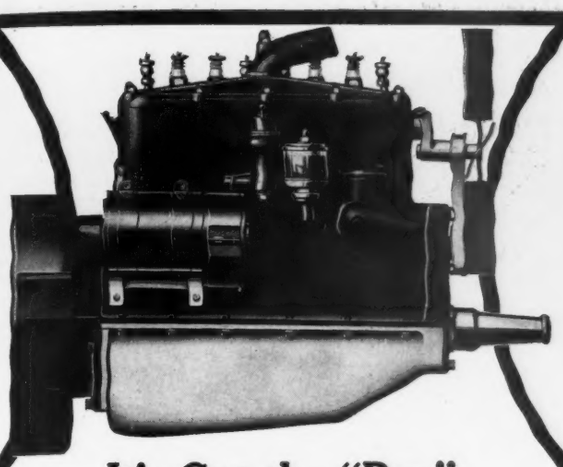


It's Got the "Pep"

that conquers mud, sand and hills, that makes it stand up to the hard grind of truck work, day after day, week after week, month after month. It's a

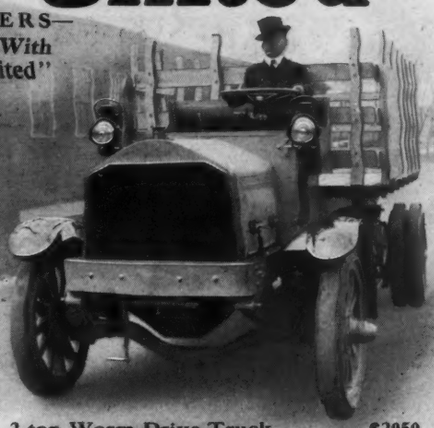
Wisconsin
CONSISTENT

Truck Motor, and it's got a reputation to sustain. Every Wisconsin Motor has behind it a long record of consistent performance. Write for illustrated catalog.

WISCONSIN MOTOR MFG. COMPANY
Sta. A, Dept. 233 Milwaukee, Wis.

The United Line

DEALERS—
"Unite With
The United"



2 ton Worm Drive Truck	$2050
3½ ton Worm Drive Truck	2900
3 ton Chain Drive Truck	2750
5 ton Chain Drive Truck	3400

Nothing Experimental—
Nothing Obsolete

Continental Motor
Eisemann Magneto
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Mayo Radiator

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Spicer Drive Shaft
United Factors
Structural Steel Frame
Yale-locked Speed Governor

Perfection Springs
Timken Axles
Timken Bearings
Gemmer Steering Gear

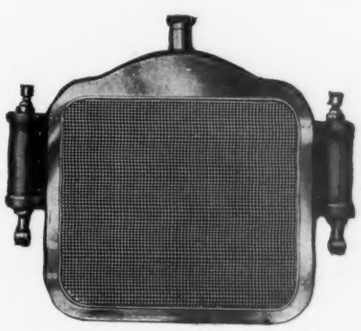
UNITED MOTOR TRUCK CO. Grand Rapids Michigan

FEDDERS RADIATORS

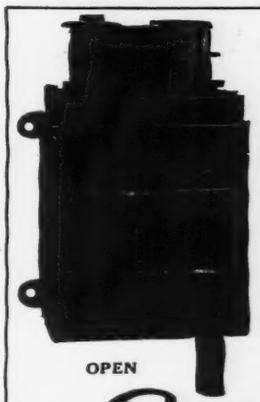
Sometimes it takes a year or two for the quality of Fedders Radiators to become apparent.

Slowly but surely the absence of heating troubles brings to the motorist whose car is Fedders-equipped the realization that he has a radiator better than the ordinary.

The realization of Fedders Quality brings about satisfaction and there it stops. Complacent satisfaction is the hardest thing in the world to disturb—witness the continued patronage of many leading car makers whose regard for Fedders Quality indicates the opinion of their customers.



FEDDERS MFG. CO., Inc.
BUFFALO NEW YORK



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Mr. Truckowner:

YOU ought to KNOW
YOU can't afford to GUESS

what your trucks and chauffeurs are doing all the time—every day.

THE SPEEDOGRAPH TELLS

It is accurate, strong, dependable, guaranteed. Get 100% efficiency for a 2% to 5% addition to your truck investment. It is dollars for cents to you.

Let us tell you about it.

CLOSED

THE SPEEDOGRAPH SALES CORPORATION
24 State St. New York City

The Independent Brewing Co. of Pittsburgh operates a Fleet of Eight 5-ton Pierce-Arrow Motor Trucks

Seven repeat orders within a period of three years constitute about the strongest recommendation this company can give the Pierce-Arrow Motor Truck. There is only one reason for such repeat orders—and that is satisfactory, efficient and economical service.

The first truck was delivered on Sept. 20, 1911, and the eighth on June 15, 1914.

These trucks have already a mileage of 64,582 to their credit, and we shall be glad to refer any genuinely interested inquirer to the Independent Brewing Co. for further details of operating records.

THE WORM GEAR

All Pierce-Arrow Trucks are equipped with the worm-gear drive, which is a positive guarantee of effective service under the most difficult conditions.

THE PIERCE-ARROW MOTOR CAR CO.
BUFFALO NEW YORK

PLAIN COMPRESSION
(Patented)

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BRASS AND STEEL
GREASE
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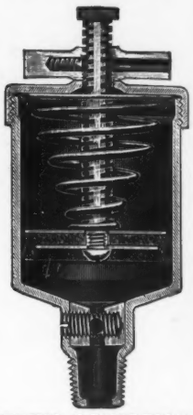
OIL CUPS

WE MANUFACTURE
a full line of Plain, Leather Packed, Ratchet, Marine, Spring Compression, and many other styles of Grease Cups.

Our line of Oil Cups is equally satisfactory and complete.

Catalogue on Application



SPRING COMPRESSOR
(Patented)

Bowen Manufacturing Co.
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GEARS

For every kind of service where quality is paramount.

Van Dorn & Dutton superiority rests on these six points:

We know by experience
We produce in quantity
We manufacture complete
We machine complete
We cut only to specifications
We deliver on time

See that the Van Dorn & Dutton

Quality Mark

is on your gears and complete differentials.

Write us today

THE VAN DORN & DUTTON CO.
GEAR SPECIALISTS
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G. V. ELECTRIC TRUCKS

SIX MODELS: 1,000 POUNDS TO 5 TONS

Over 4,000 in use
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GENERAL OFFICES AND FACTORY:
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When Writing, Please Say—"Saw Your Ad. in the C C J"

ESTABLISHED 1909 INCORPORATED 1914

SIX YEARS OF SUCCESS

The United States Motor Truck Co.

Cincinnati, Ohio

OFFERS A FINE OPPORTUNITY TO DEALERS

GET OUR PROPOSITION

Made in
2, 2½, 3 and 4 ton
Capacity

THE correctness of its construction combined with best quality materials and right prices, make the U. S. a splendid value for buyers and a good proposition for dealers.

SPECIFICATIONS AND PRICES ON REQUEST

The Brakes Won't Hold!

Did you ever get sucked into rapids in a canoe? You feel the same way when your brakes suddenly fail you on a bad hill. It's the duty of every automobile dealer to impress on his customers the vital, life and death importance of good brakes. REMEMBER—brakes are not infallible. THEIR EFFICIENCY DEPENDS ENTIRELY ON THE BRAKE LINING. If the brake lining suddenly goes bad—becomes friction shy—you have no more control over the car than you would have on a barrel shooting Niagara.

Thermoid
HYDRAULIC COMPRESSED
Brake Lining-100%

Thermoid is Brake Lining all through—not merely on the surface. It is a substance which has been hammered by hydraulic compression to a uniform density—it is not a stringy, loosely woven fabric with only friction surfaces. Thermoid will still hold even though worn paper thin. It is 100 per cent brake lining.

Watch the brake lining of cars sold by you or in your care. Guard the safety of your customers by having every car equipped with Thermoid.

Cannot be burned out, nor affected by oil, heat, water, gasoline, dirt

THERMOID RUBBER CO., Trenton, N. J.

OUR GUARANTEE:
Thermoid will make good or we will

DIXIE 20TH CENTURY MAGNETO

A full spark at lowest possible engine speed, increasing in intensity to top engine speed with none of the lag at higher speeds associated with timer distributors— this is the

20th Century DIXIE

SPLITDORF Electrical Co.
NEWARK, N. J.

(All SPLITDORF features are fully covered by patent or patents pending)

Spicer Universal Joints

Universally Accepted as the Most Dependable Flexible Connection Known to Motor Car Practice

Oil-Tight Dust-Proof

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Stegeman

PRICES REDUCED

—ON—

STEGEMAN TRUCKS

Never before has it been possible to obtain trucks of this high quality at such low prices.

Specifications same as before: Continental motor, Brown-Lipe gears, Timken bearings, multiple disc clutch, Stromberg carburetor, Eisemann magneto, *guaranteed springs, etc.—all "The World's Best Units."* Simplest, Strongest and Easiest riding trucks for their capacities, on the market.

A reduction of $200 to $350 from old prices—

1 -ton - - -	$1600.00
1½-ton - - -	1900.00
2½-ton - - -	2500.00
3½-ton - - -	3000.00

Send for descriptive literature and *you* be the judge of the value.

Stegeman Motor Car Co., MILWAUKEE WISCONSIN

LEAKING GASOLINE COSTS MONEY

and sooner or later the old-fashioned riveted gasoline tank will leak—perhaps just a tiny leak which is hardly noticed, but which is a continual drain on fuel money, perhaps one which will result in explosion or fire.

Protect your pocketbook and guard your property and the lives of your employees by equipping your trucks with the

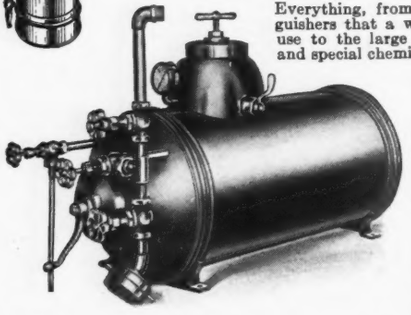
"JASCO TANK"

"JASCO" SAFETY FIRST TANKS

the drawn steel, seamless, leakless, tinned and tested gasoline tank that protects life and property. All styles, all sizes, at your dealer's or direct.

JANNEY, STEINMETZ & CO.
MAIN OFFICE: PHILADELPHIA
NEW YORK OFFICE: HUDSON TERMINAL BUILDING

DEPENDABLE Chemical Fire-Fighting APPARATUS



Everything, from the hand extinguishers that a woman or child can use to the large Chemical Engines and special chemical tanks for Fire Department service.

Into each is put material and workmanship that cannot be excelled. Designs are shown by actual use to be beyond improvement.

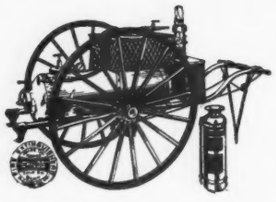
Result: Perfect and immediate action when needed, no deterioration from lack of use or age.

All Our Tanks Are Made of Copper

The name "CHILDS" stands for perfection.

Chemical Tanks for Fire Department or other service made to order.

Write for our Complete Catalogue and interesting talk on Fire Apparatus.



O. J. CHILDS CO., Utica, N. Y.
MANUFACTURERS FIRE APPARATUS

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Types:

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Nickel Gears
Ball Bearings
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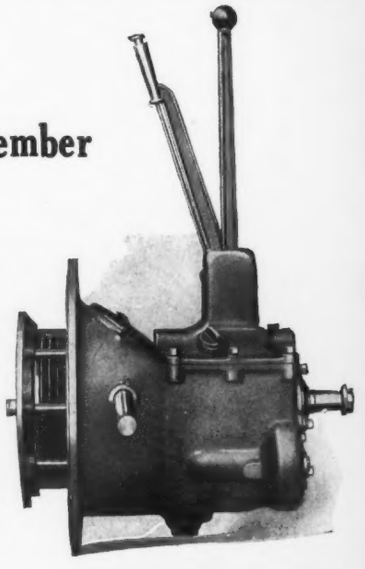
Center Control

Trucks
¾ to 2 Tons
2 Sizes



Complete details on request

FULLER & SONS MFG. CO.
KALAMAZOO, MICH.

FOUR-WHEEL DRIVE

the truck which, by remarkable performance in the United States army tests, turned the attention of the country to the vast advantage of the F. W. D. and its great superiority over all other makes.

"WHERE NONE BUT ARMY MULES HAD GONE BEFORE"

Climbing Norwalk Hill in U. S. Test—the only loaded truck to make the grade

We are the first and oldest builders of four-wheel drive trucks in this country. After millions had been spent trying to successfully apply power to four wheels, we hit upon the right method. Our first truck was a triumph. It has now been

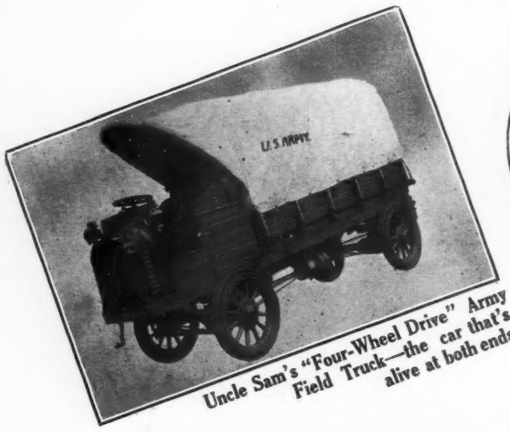
Endorsed by U. S. Army, Foreign Governments and American Manufacturers

Made in 1½, 3 and 5 Ton Capacities

The Four-Wheel Drive Auto Company

Clintonville, Wisconsin, U. S. A.

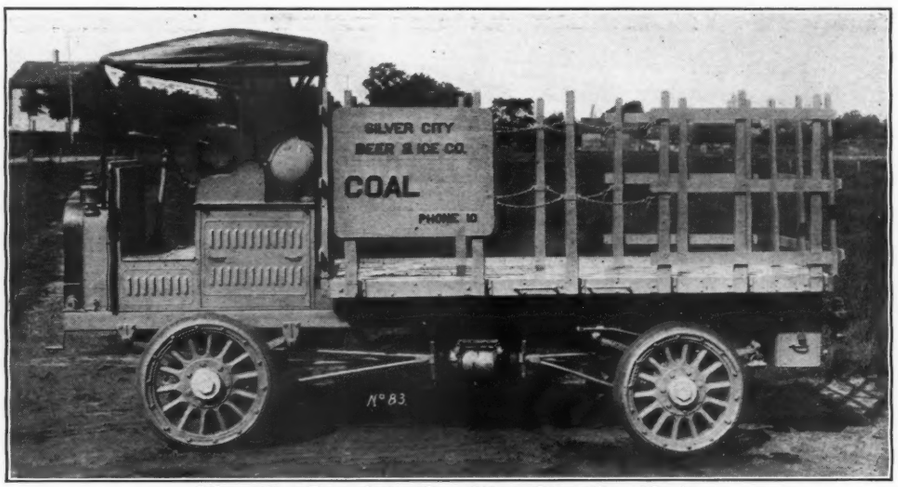
When Writing, Please Say—"Saw Your Ad. in the C C J"



Uncle Sam's "Four-Wheel Drive" Army Field Truck—the car that's alive at both ends

WHEEL 4 DRIVE

In Service Western Utah Transportation Co., Wendover, Utah



Silver City Beer & Ice Co., Silver City, New Mexico

Efficiency

The prime consideration in buying a truck is—Will it do the work for which it is being purchased? All other factors fade into insignificance before this one, for of what avail are features, etc., if the truck can't do its work **all the time?**

Therein is the great selling strength of the "Four-Wheel Drive." It is a **continuously** efficient truck. It doesn't need good roads, level streets, fair weather or favorable conditions to render efficient service, but it is on the job **every** day under **every** condition, and absolutely nothing daunts it in the performance of its work.

This is the result of the correct application of the four-wheel drive principle, delivering power to all wheels without the use of gears, both pair of wheels being driven through a full-floating axle. This gives such greater pulling power that in places like the Inter-Mountain District—Utah, Colorado, Nevada and Mexico—where railroads do not go and lines of traffic are either over precipitous mountain roads or desert sands, the F. W. D. has proved a welcome solution to exceptionally difficult haulage problems. That's the plain, unvarnished reason why the war departments of all the leading governments **depend upon "The Four-Wheel Drive Trucks"** for their important motor service.

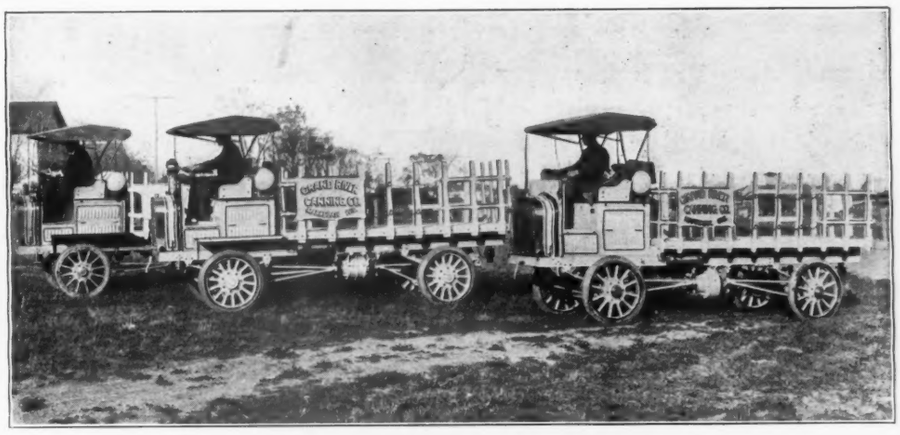
Here is an illustration of F. W. D. efficiency in such service—On April 23rd, at Fort . . . . . , the officers of the English War Department established a new world's record by hauling with one of their F. W. D. trucks, purchased from this Company, a 6-inch siege howitzer, weighing 5 tons, the gun platform weighing 1½ tons, 15 men and a load of supplies, 88 miles, over highways, hills and fields, in 7½ hours, consuming 22 gallons gas and 1½ pints lubricating oil.

In foreign war service at this time, the F. W. D. truck is regularly employed in moving these great guns and placing them in sunken roads, lanes, fields, etc., and is in each case replacing 16 horses.

Columbia Express Co., Philadelphia, Pa.

WHEEL 4 DRIVE

Hamm Brewing Co., St. Paul, Minn.



Grand River Canning Co., Markesan, Wis.

Economy

Following hard upon the heels of efficiency comes the question of Economy. While war departments may ignore all other factors but efficiency, the business man must consider economy as well, for if the attainment of efficiency costs too much, then it is not profitable.

Here, again, the "Four-Wheel Drive" stands supreme. It is the most economical truck of its capacity that you can find.

This is not a matter of argument, but of FACTS.

By dividing power and load and strain, the F. W. D., with its method of applying power to four wheels, not only overcomes the obstacle of winter snows and skidding over wet pavements, but positively DOES effect a saving of from 25 to 40 per cent in operation and maintenance. Users of the F. W. D., on the city pavements as well as in the roughest country, make affidavit to this.

Nor is this all. The wear on the moving parts is so distributed that they last far longer than in the ordinary truck, and the repair cost is so slight as to be inconsequential. The "Four-Wheel Drive" stands alone, because it combines the utmost in **efficiency** with the greatest **economy.**

Dealers---Attention!

Sell the truck that defies competition

The "Four-Wheel Drive" offers the right kind of dealers a splendid opportunity to build up a highly lucrative and permanent business.

With this truck you can absolutely defy any and all competition, because there is no truck of similar capacities which has the same ability—

To "get there" with the load under all kinds of road conditions.
To deliver the load with a saving of 25 to 40 per cent over any other type of car.
To be on the job every day.
To meet every condition of freight haulage.
To stand up continuously under arduous service.
To DEMONSTRATE the absolute truth of these claims.

These factors create **salability** and cause absolute satisfaction after the truck is sold. It is but the plain truth to say that the "Four-Wheel Drive" has never yet failed to make good, or to give satisfaction, or to prove a profitable investment in service for which it is designed.

Think of selling a truck with a record like that, a truck with the ability of the "Four-Wheel Drive," a truck with its low operating and maintenance cost, a truck with such an unparalleled record of achievement. Think of it, and you can understand why the agency for the "Four-Wheel Drive" offers such an exceptional opportunity to build up a permanent and profitable business.
Your territory is ripe for this truck and you can profit greatly by being the dealer to handle it. If this prospect appeals to you, write at once for territorial terms, complete catalog and detailed information. Write today.

5 Ton Truck of Rahr Brewing Co.

The Four-Wheel Drive Auto Company

Clintonville, Wisconsin, U. S. A.

M

A REASON WHY

There is always a reason why a man buys a truck of some particular make. In the case of a truck driven by a Cleveland worm and wheel the "reasons why" are in evidence.

The "reasons why" to buy are the convincing reasons for putting across sales.

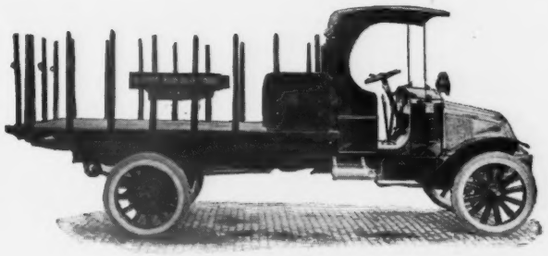
Have you a real "reason why" on your car that will convince and sell? If not you have to work twice as hard. Think it over a little.

The Cleveland Worm & Gear Company

Cleveland, Ohio

KREBS TRUCKS

Timken-David Brown Worm Drive



Krebs Automatic Governor

Model H, 2-Ton Truck

These features alone make the truck sell regardless of the many other high-class units and features which make the **Krebs** the most desirable and economical truck for a business man to buy.

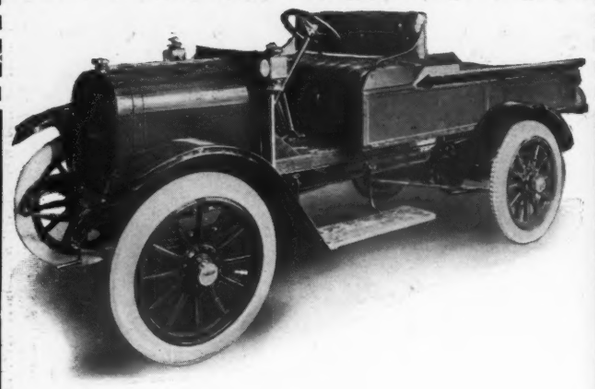
The Timken-David Brown Worm Drive is the most efficient drive ever devised for a motor truck, and is noted for its silence, economy and long life.

The **Krebs** Governor automatically controls the motor so as to maintain the desired speed regardless of changing road conditions, and enables the driver to get the necessary power without waste of gas. It provides a sensitive control, better even than an expert's, and leaves the driver with nothing to do but steer.

The **Krebs** ranks with the leaders in the truck field and offers advantages not found in any other make. Four models meet nearly every requirement and constitute a line that is very profitable for a dealer to handle. Model I has 3 tons capacity, Model H 2 tons, Model G 1 ton, and Model F ¾ ton. Write for detailed information about them and our sales plan.

THE KREBS COMMERCIAL CAR CO., Clyde, Ohio

When Writing, Please Say—"Saw Your Ad. in the C C J"



Only $990 for this 1500 lb. Delivery Car having Standard Parts and including Body

This is the very attractive proposition that a dealer can offer his trade in the

HOWARD LIGHT DELIVERY CAR

Here is a car of the most useful and desired capacity, having units of such high class as to establish its quality in the minds of all, which you can sell **with body** for much less than nearly all makers of 1500 lb. cars ask for the **chassis** alone.

Surely this ought to be a fast seller in the hands of any energetic dealer, for it enables him to offer a car of standard parts at a price with which other dealers cannot compete.

Just think of being able to sell a car of this capacity, having Continental Motor, Eisemann Magneto, Long Radiator, Covert Transmission, Salisbury Axles, Ross Steering Gear, Parish & Bingham Frame, 107″ wheelbase, and body having loading space 78″ x 42″, for less than $1000.

One type of body only, but is also adapted for 12-passenger jitney 'bus.

This is a live proposition which will be a big money maker for dealers everywhere. Write about your territory without delay.

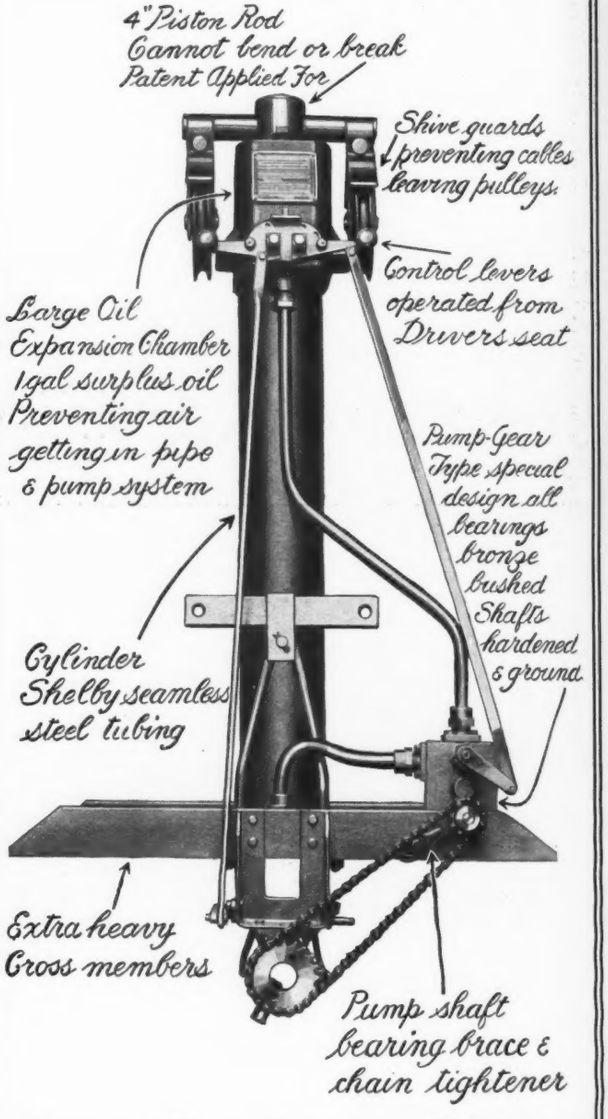
Robert G. Howard
87 Church Street Boston, Mass.

THE **WOOD**

Hydraulic Hoist

Solves the Dumping Problem for

Motor Dump Trucks


4" Piston Rod
Cannot bend or break
Patent Applied For
Shive guards preventing cables leaving pulleys.
Control levers operated from Drivers seat
Large Oil Expansion Chamber 1 gal surplus oil Preventing air getting in pipe & pump system
Pump-Gear Type special design all bearings bronze bushed Shafts hardened & ground.
Cylinder Shelby seamless steel tubing
Extra heavy Cross members
Pump shaft bearing brace & chain tightener

Improved Heavy-Duty Type "D" Hoist

"Made in Detroit Only"
by the

Wood Hydraulic Hoist & Body Co.
560 Franklin Street DETROIT, MICH.
Successors to
Wood Hydraulic Hoist Company, St. Paul, Minn.

TRUCK SPRINGS

There's a great difference in both the character and duration of service obtained from various makes of springs.

That difference is due to the quality of materials employed, the method of treatment, the equipment of the producing plant and the knowledge and workmanship involved.

THE SPRING PERCH COMPANY, ever since the inception of the automobile industry, has enjoyed an enviable reputation as the leading manufacturer of QUALITY SPRINGS, both for pleasure and commercial vehicles.

The company is equipped with furnaces of most recent and perfected models, affording absolute pyrometer heat control, and in the fabrication of SPRING PERCH CO.'S springs a unique and up-to-date equipment is employed, while thoroughly tested modern methods cover each operation.

We manufacture truck springs for such companies as Packard, Pierce-Arrow, General Vehicle and others.

Spring Perch Co., Bridgeport, Conn.

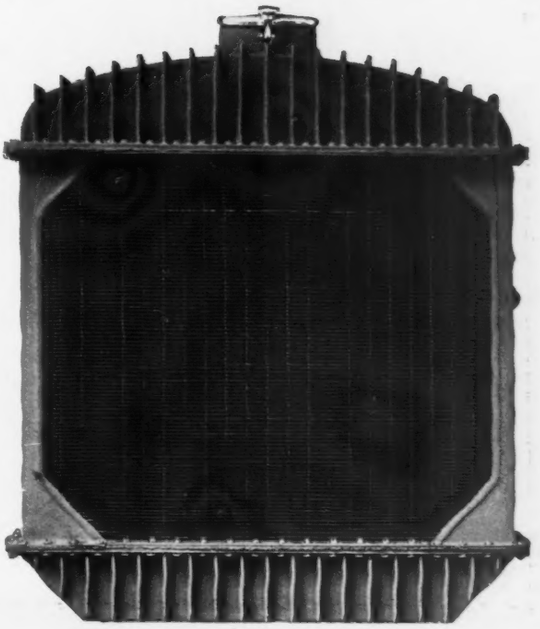
LONG COOLING SYSTEMS

CO-OPERATION with the engineering department of the best manufacturers of motor trucks and tractors has enabled us to develop and perfect many improvements which make our product the highest quality on the market and within a price that is more than consistent with same.

With our large, modern, fully-equipped plant and efficient organization we can guarantee production sufficient to meet the demands of the largest manufacturers and in accordance with our agreements.

Several types of Long Cooling Systems are made—Cellular, Flat Tube, Honeycomb, Spiral Tube, Fin and Tube

Write for catalog. Or—if you wish, we will gladly send our representative to confer with you relative to your radiation problem.



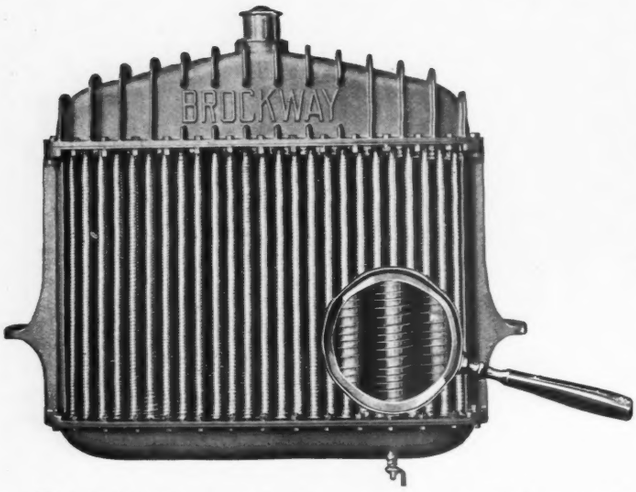
Tube and Plate Type for Truck Service

LONG MFG. COMPANY

DETROIT MICHIGAN

When Writing, Please Say—"Saw Your Ad. in the C C J"

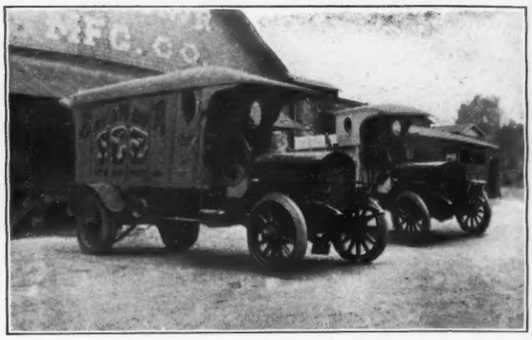
ROME RADIATORS



This is the ideal radiator for trucks. It is unsurpassed in quality and efficiency and its cooling section is guaranteed for the life of the truck. Ten years of prestige are back of ROME RADIATORS and their record assures good service. Send us your blue prints.

Rome-Turney Radiator Company
Jasper Street, Rome, New York

ROWE MOTOR TRUCKS



are used in every line of business and in every case have proved the most economical means of hauling.

A Rowe Truck will save you money in transporting your merchandise.

The Rowe Truck is guaranteed to give

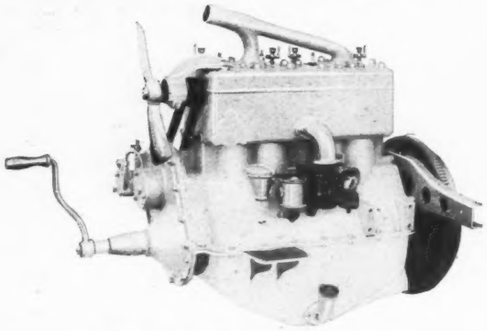
Continuous Economical Operation

Worm or chain drive. One to five tons capacity

Rowe Motor Manufacturing Co.
Downingtown, Pa.

THE RUTENBER MOTOR

This new Model 20 is an ideal motor for light capacity trucks



Model 20, 3½ x 5, 4 cyl.—30-35 H. P.
For Trucks of ½-1½ Ton Capacity

This is a 1915 product designed especially to give a high-grade, dependable motor at low cost in quantities, for commercial cars. It is an efficient high-speed motor with extra large bearing surfaces, plain and simple design, strong, durable and possessing characteristics most desired in this kind of service. Write us for complete information.

The Rutenber Motor Company
Marion - - Indiana

PROTECT YOUR GARAGE
Against Fire and Explosion

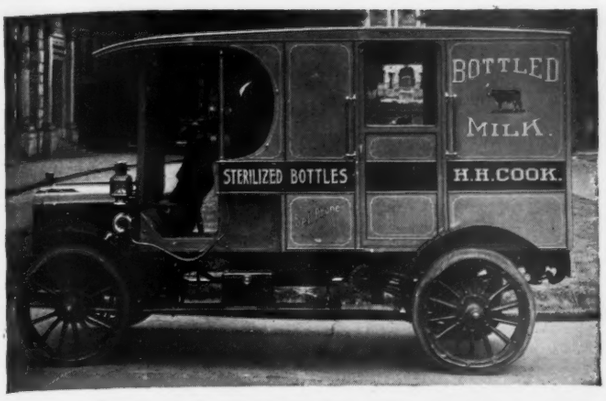
by following the example of many big makers and users of trucks who now store their gasoline in

McNUTT NON-EXPLOSIVE GASOLINE CANS

These cans are so constructed that an explosion cannot take place, even if premises burned to the ground through other cause. So safe are they that you can apply a lighted match to a filled or partly filled **McNutt Can** without the slightest risk.

McNutt Cans are used and endorsed by the United States Government, and all users of gasoline find that **McNutt Cans** enable them to store gasoline with absolute safety. Write for full information.

John C. Eames, Inc.
320 Broadway New York



BESSEMER TRUCK

Illustration shows Model "C" which is equipped with either pneumatic or solid tires. There is more real sturdiness built into this than in any other one-ton truck on the market.

Three Models

MODEL C	MODEL A	MODEL D
1 Ton Capacity	1½ to 2 Ton Capacity	1½ to 2 Ton Capacity Worm Drive
25 H. P.—$1250	30 H. P.—$1800	30 H. P.—$2300

DEALERS: Write us about the special proposition we have for you. The Bessemer line enables you to handle every truck requirement.

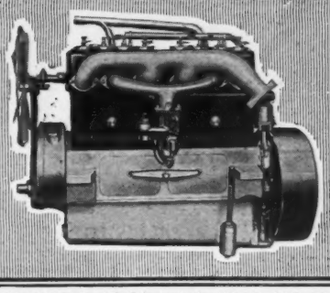
BESSEMER MOTOR TRUCK CO.
GROVE CITY, PA.

THE Waukesha Long Stroke Truck Motor is constructed to fulfill every obligation of the truck manufacturer to the purchasers of his trucks. It gives the purchaser what he expects—and what he pays for—namely: *efficiency, reliability, dependability, workability.* Its immense capacity for hard work and hard knocks is due to design and construction of unusual merits.

Like Uncle Sam's war-dogs, the Waukesha is built to *resist* the forces of destruction.

WAUKESHA

4¾×6¾" LONG STROKE TRUCK MOTOR



Strength of construction is not the Waukesha's sole merit It has the remarkable fuel economy of ¾ of a pint of gasoline per horse power per hour. It's a motor with unlimited strong selling features for your truck—because it makes good every promise your guarantee contains.

We'll be glad to send detailed information on request.

WAUKESHA MOTOR CO., Dept. A., Waukesha, Wisconsin

LAVIGNE STEERING GEARS

The Peer of Gears
For quality Motor (cars) (trucks)

We are Steering Gear specialists.

We command the largest percentage of the Steering Gear business.

All of our product is made of the highest grade materials, all working and wearing parts made from alloy steels, pack hardened, water and oil treated, ground to gauges. Insuring interchangeability, easy steering and irreversibility.

The Value is honest
The Judgment expert
The Sale sincere

Write for detailed information.

LAVIGNE GEAR CO.
Racine - - Lock Box 324 - - Wisconsin

The Latest Type
Wood Hydraulic Hoist

made to fit any chassis. Will dump a load in thirty seconds. Great time saver in hauling coal and building material.

Write for our descriptive booklets and prices

Hydraulic Hoist Mfg. Co.
172 West Fifth Street Saint Paul, Minn.
Original builders and successors to Wood Hydraulic Hoist Company

DENBY

Motor Trucks

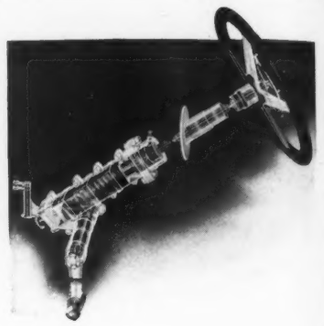
Designed by men who have been identified with commercial motor vehicles since the infancy of the industry.

Built in a new plant, free alike from obsolete ideas and obsolete machinery.

Four models—¾ ton to two ton—each with possible chassis and wheelbase modifications that enable the Denby truck to be fitted exactly to the needs of any business.

Denby Motor Truck Company
28 Dubois Street, Detroit, Michigan

ROSS
Steering and Differential GEARS
will help sell your trucks



They are STANDARD on good motor truck construction

INVESTIGATE
our new complete line of fore and aft steering gears

Enormous bearing surfaces
Perfect lubrication
Best material throughout
Finest workmanship

Built in the largest and newest steering gear factory in the United States.

WRITE FOR CATALOG

ROSS GEAR & TOOL COMPANY
790 Heath St. :: Lafayette, Ind.

CANDLER TRUCK RADIATORS

Thoroughly Reinforced

Unusual Strength—High Efficiency

The Candler Special Truck Radiator is the strongest construction on the market to-day. It is highly adapted to truck use, by virtue of its efficiency, strength and durability, non-leakable and non-freezable features as well as its ease of repair.

We invite correspondence from those interested in a Practical and Serviceable Truck Radiator.

CANDLER RADIATOR COMPANY
DETROIT, MICH.

SCHWARZ WHEELS

Patented Aug. 25th, 1904

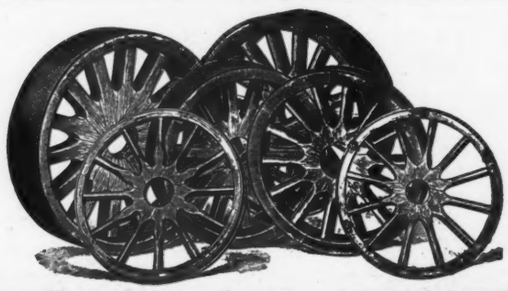
Used by the makers of most quality trucks, because they offer the utmost in strength, safety and economy.

Desired by truck buyers, because they are a known product whose superiority has been conclusively demonstrated.

Wanted by dealers, because they are an assurance of quality and make a truck easier to sell.

"Bear the Burden"—a booklet—will tell you why this is so—send for it.

The Schwarz Wheel Co.
Frankford Philadelphia Penna.



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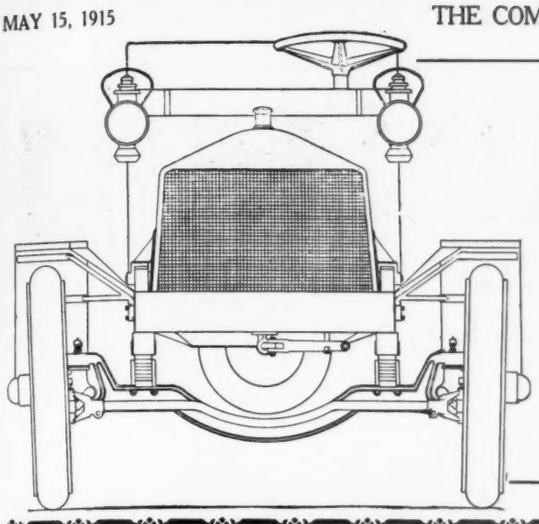


The Truck that is Standardizing Trucking

Dealers:—Spare one minute and think why the **"Standard"** is the most logical truck for you to sell.

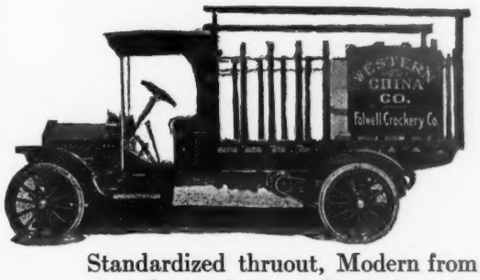
1st—Because **"Standards"** are made as good, if not better, than any truck, regardless of make or price, and sell for a lower price.

2nd—Because **"Standards"** have been tested 4 years—tried and proven to give continuous service and stand the "gaff".

3rd—**"Standards"** combine a standardized assembly of absolutely high-grade superior units such as: Continental Motors, Brown-Lipe Transmissions, Timken Axles, Timken Bearings, Gemmer Steering Gears, Eisemann Ignition, Stromberg Carbureters, etc.

Does experience mean anything to you? If so, let us send you our agency proposition. Write now.

Standard Motor Truck Company, 502 Bellevue, Detroit, Mich.



DEALERS, ATTENTION!

MODERN

THE BOWLING GREEN MOTOR CAR COMPANY

TRUCKS FOR 1915

Standardized thruout, Modern from radiator to tail lamp, built in chain and worm-drive models. Just the truck to get the business in your territory. ***Live dealers should write for catalog.***

THE BOWLING GREEN MOTOR TRUCK CO., Bowling Green, Ohio

BUCKEYE Motor Truck Jacks

Buckeye Motor Truck Jacks are safe, reliable and made to stand the wear and tear for which they are intended. They are fully guaranteed, and cannot possibly drop with a load. They are made from Steel Drop Forgings, best finish and workmanship throughout.

Get our prices before you place your orders for jacks, we can save you money.

No.	Height Bar Down	Raise of Bar	Height Bar Up	Weight	Capacity		List Price
7	11¼″	6½″	18″	16 lbs.	2½ tons	with formed handle	$10.00
13	14¼″	7½″	20½″	26½ "	3 "		15.00
14	14¼″	7½″	20½″	33 "	5 "		16.00
9	11½″	6″	17½″	10 "	1½ "		6.00

Write today for descriptive catalog. Made only by

THE BUCKEYE JACK MFG. CO., Alliance, Ohio

FRAMES

THE PARISH & BINGHAM CO.
CLEVELAND, OHIO

Our Entire Engineering Force is at Your Disposal

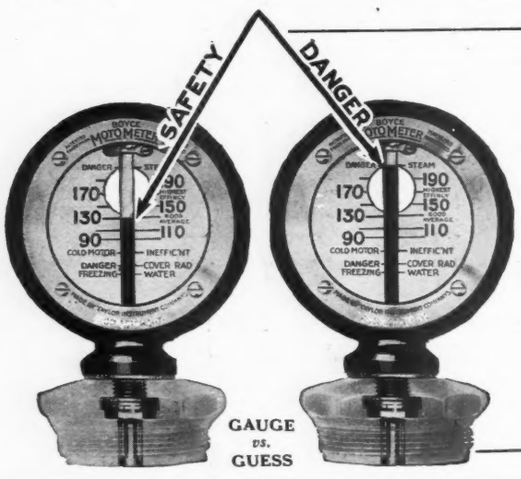
CRAMP BUSHINGS

Bushings, of all things, should be of proven quality. Truck Builders who aim to build faultless service and long life into their cars take no chances, they use CRAMP BUSHINGS, made of the famous Cramp Special Bearing Bronze.

Cramp Bushings have highest compressive strength and real anti-friction qualities. We are prepared to furnish bushings machined complete, ready for installation or the ingots and rough castings as you may desire.

Endow your car with the Cramp reputation by specifying Cramp Special Bearing Bronzes. Write us about it.

WM. CRAMP & SONS SHIP & ENGINE BUILDING CO., Philadelphia, U. S. A.



GAUGE vs. GUESS

Why Packard Trucks Have Adopted as Standard Equipment

Boyce MotoMeter

The Radiator Heat Indicator

In the past, your drivers have perhaps trusted to "guess" to tell them when the radiator water is low; when their oil supply is insufficient; when a fan belt breaks, etc., but a Boyce MotoMeter will warn the driver miles in advance of these conditions, insuring the truck against motor damage.

During the cooler months over one-third of the gasoline can be saved by operating the motor at proper heat. Write today for full particulars.

THE MOTOMETER COMPANY 1790 BROADWAY NEW YORK CITY

Highland Has the Right Body Type

Stake Body, Cleveland Type, with Removable Flare Boards

THE Highland Body line is complete, and comprises more than 100 capacities, styles, and sizes of bodies to fit standard chasses. Any merchant, dealer or manufacturer will find in our line a body suited to serve his needs. The right type of body determines the real commercial value of your motor delivery or hauling system, heavy bulk or concentrated weight. The big, feathery load or the little package will find a suitable body contained in our line.

Get Our Catalog

No. 10.—Commercial Bodies for light chasses
No. 14.—Commercial Bodies for heavy chasses
No. 15.—Commercial Bodies for Ford chasses
No. 3.—Highland 'Bus Bodies for Ford chasses

HIGHLAND BODIES ARE BUILT

Highland Bodies are machine built to exceed the life in service of the chasses upon which they are placed.

HIGHLAND BODIES FIT

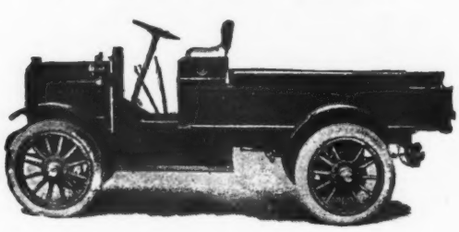
They are made to fit standard chassis from definite plans and patterns, made ready at our plant with all equipment for the proper securing to the chassis for which they are designed. Any dealer can attach a Highland Body.

The Highland Body Mfg. Co.
508 Elmwood Place
Cincinnati, Ohio

DEALERS:
Be sure to profit by our 1915 dealers' contract. You get all of the business that comes from your territory.

Flint

About 2000 Lbs. Capacity

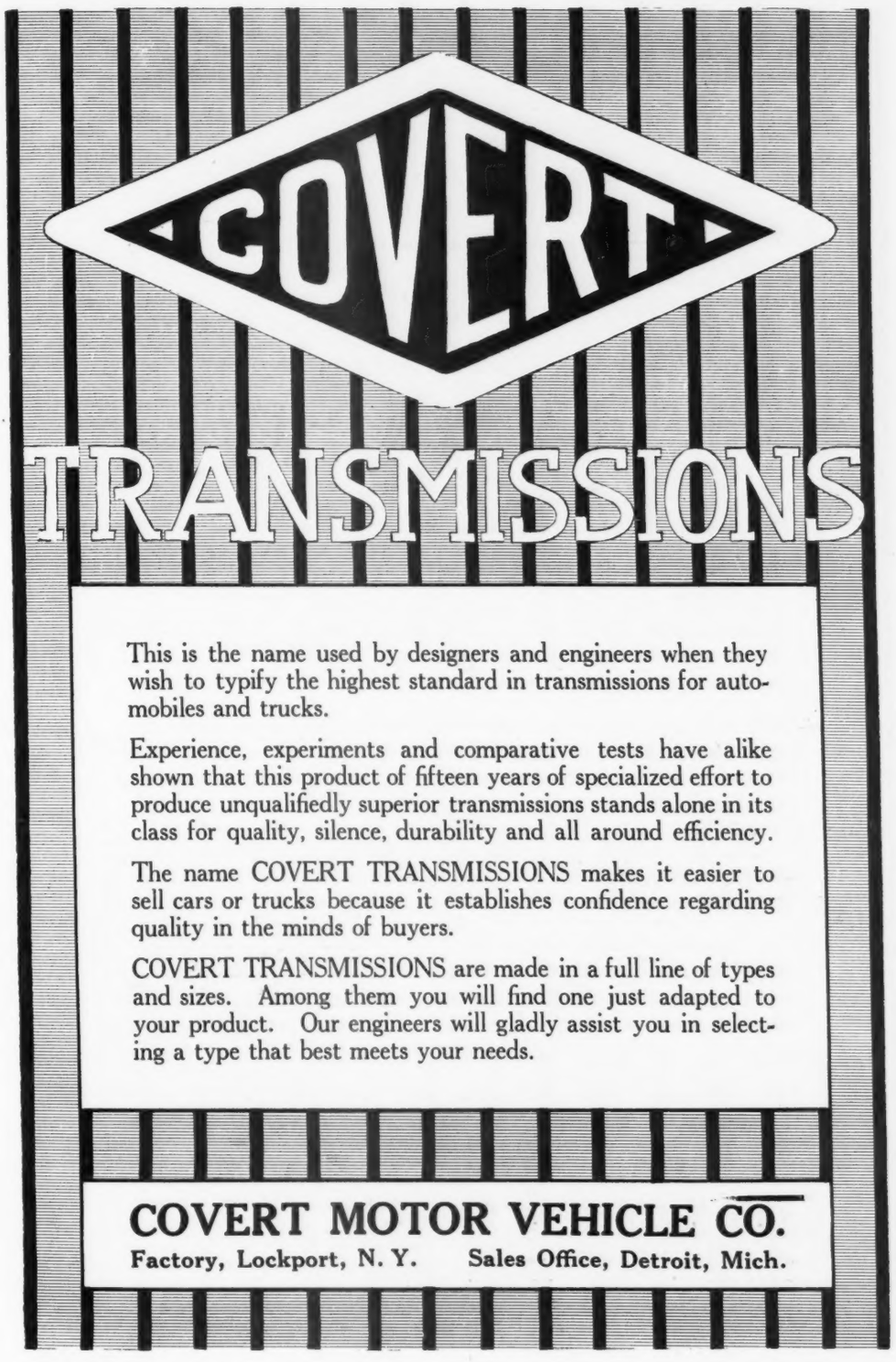


Another Satisfied User

C. E. Brandt & Company, Wholesale Paper and Twine Dealers, Flint, Mich., writes: "Because of the service your 'Flint' Truck has been giving us, we feel you should know how well we are pleased. It is doing the work of two horse-drawn vehicles, sometimes three. In service six days a week without any trouble. Loads run from 1200 to 2000 pounds. Averages 12 miles to gallon gasoline, and 100 miles to gallon oil."

This is the sort of service that is built into all "Flint" Trucks. They satisfy both user and dealer.

FLINT MOTOR WAGON DEPARTMENT
DURANT-DORT CARRIAGE COMPANY, FLINT, MICH.



This is the name used by designers and engineers when they wish to typify the highest standard in transmissions for automobiles and trucks.

Experience, experiments and comparative tests have alike shown that this product of fifteen years of specialized effort to produce unqualifiedly superior transmissions stands alone in its class for quality, silence, durability and all around efficiency.

The name COVERT TRANSMISSIONS makes it easier to sell cars or trucks because it establishes confidence regarding quality in the minds of buyers.

COVERT TRANSMISSIONS are made in a full line of types and sizes. Among them you will find one just adapted to your product. Our engineers will gladly assist you in selecting a type that best meets your needs.

COVERT MOTOR VEHICLE CO.

Factory, Lockport, N. Y. Sales Office, Detroit, Mich.

SHELDON

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¶ It is filled with information that you will be glad to have.

¶ Send for it—read it—file it for future reference.

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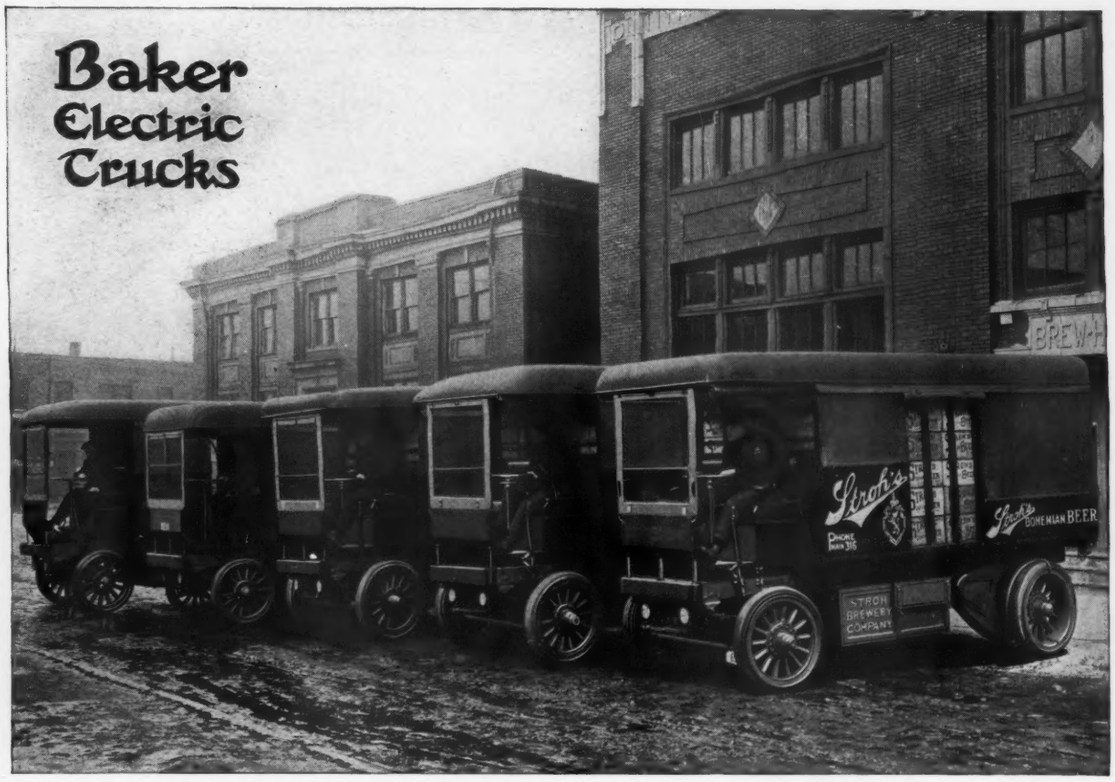

Baker Electric Trucks

are in service in 98 distinct lines of trade in as many different cities located in the United States, Canada, Alaska, England, France, Porto Rico, South America, South Africa, Siam, Japan and Australia. Our Truck catalog shows many of these trucks and gives interesting figures on what they have actually done. May we send it to you?

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Body designs to meet any requirement.

The Baker Motor Vehicle Co., Cleveland

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"The Worm-Drive Line"

The Chase Model O

7000 lbs. Capacity Chassis Price, $3300

Model O, for heavy-duty trucking, offers a car of superior worth—standard in design—at a price within the purchasing power of every prospective truck buyer.

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Model O is especially suitable for manufacturers of heavy machinery or bulky merchandise. It makes an ideal ice vehicle or furniture van, and is used widely for "dump", 'bus, and heavy merchandise purposes.

We will supply any type of body to meet the hauling requirements.

Send for literature and our dealer's proposition today. You will be interested in the Chase sales plan.

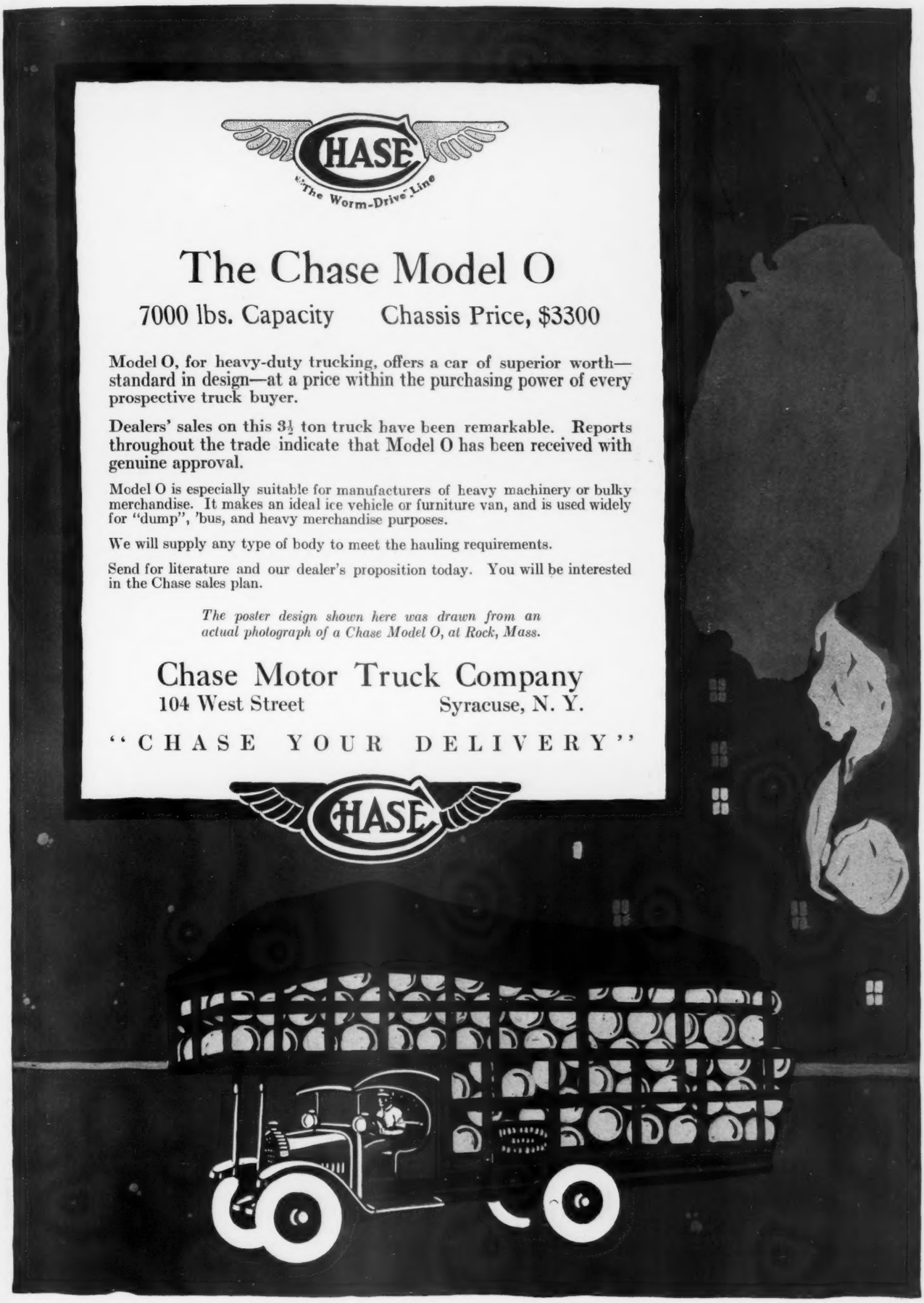
The poster design shown here was drawn from an actual photograph of a Chase Model O, at Rock, Mass.

Chase Motor Truck Company

104 West Street Syracuse, N. Y.

"CHASE YOUR DELIVERY"

CHASE



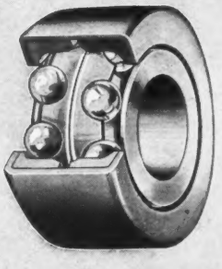
This is not a wreck but shows a practical vehicle operating in deep mud

NEW DEPARTURE BALL BEARINGS

American Made for American Trade

ARE used as the bearing equipment in the wheel hubs and in the transmission of this worm gear drive, Morton Giant: Four Wheel Drive and Four Wheel Steer, Sixty Horsepower Gasoline Tractor,

Accepting every thrust, strain, wedge, or shock, vertical, angular, or horizontal, under every condition of road or load, minimizing power waste, increasing the life of the vehicle and reducing its consumption of gasoline and oil and general up-keep cost.



New Departure Ball Bearings do all this, not only for the time being, but throughout the life of the vehicle itself.

Let us tell you more of these "Quality Bearings" through our catalog. Send for a copy.

THE NEW DEPARTURE MFG. COMPANY,

Distributors in Trade Centers throughout the United States

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"Diamond Grid"

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ECONOMY

LIFE
MILEAGE

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We make a specialty of vehicle batteries.

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Grinnell Electric Car Co.
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We have sold more batteries and plates for new cars than any other storage battery company.

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CHILTON publications — the **Automobile Trade Journal** and the **Commercial Car Journal** — are Charter Members of the A. B. C., the CCJ being the only exclusive motor truck publication which is a member to date. The A. B. C. Auditors' Reports for both these publications are ready and will be sent you on request. It will be to your interest to have these reports for purposes of comparison.

MR. RUSSELL WHITMAN, Managing Director of the A. B. C., 15 E. Washington St., Chicago, will gladly supply any advertiser or publisher with complete information regarding the service and membership. Better write him to-day.

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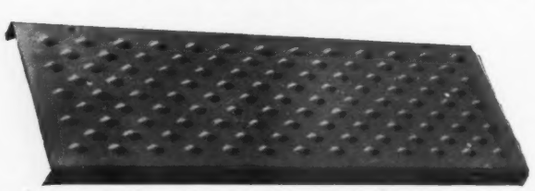

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Selden Trucks are built for long, hard service. They possess greater built-in strength than other trucks of their capacity---because all their parts are larger and stronger and they are made of the best materials obtainable. Two models are offered:

The Worm-Drive Model

Capacity, 2 tons. Price, $2250

The Chain-Drive Model

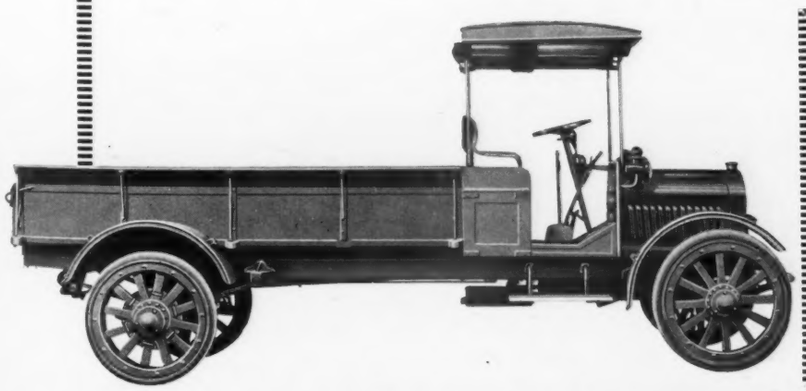
Capacity, 1½ tons. Price, $2000

The purchase of a Selden Truck is a paying investment.

Selden Trucks are easy to sell. Their price is low and they can be sold on our easy payment plan—pay for themselves while they are running.

The Selden proposition is an attractive one to the dealer. It would pay you to look into it.

Selden Truck Sales Co.
Rochester, N. Y.



SELDEN TRUCK SALES COMPANY
Rochester, N. Y.

Gentlemen:—I would like to know more about your proposition.

Name .....

Address .....

Town .....

State .....

Date.....

EISEMANN

To permit, without the use of tools, the removal of the magneto simply by lifting it straight up — and to compensate for any deviation in the driving line of the driving and driven members of the magneto, the Eisemann flexible, adjustable Magneto coupling has just been placed on the market.

This coupling which may be used with any standard magneto, is dust, dirt and practically wear-proof. It admits of an adjustment to the timing over a range of 40 degrees (plus or minus 20 degrees) without dismounting either the magneto or the coupling. It also cushions the driving power.

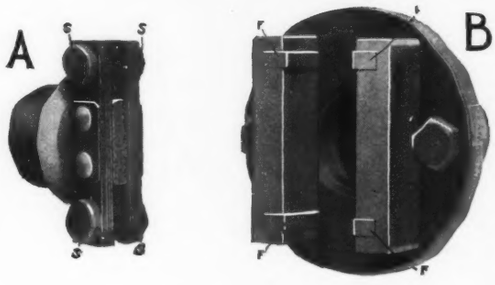
The retail price of the Eisemann Magneto coupling is $3.25. Ask your dealer or send to us direct.

The Eisemann Magneto Co.

Sales and General Offices
32-33d St., Brooklyn, N. Y.

New York 245 W. 55th St
Indianapolis, Ind. 415-417 N. Capitol Ave.
Detroit, Mich. 802 Woodward Ave.

Eisemann Adjustable Magneto Coupling



The driving member A is attached to the Magneto driving shaft. Driven member B is attached to the magneto armature shaft. A is free to move within B to compensate for misalignment in one direction, while the flexible laminated steel springs in driving member A compensate for any misalignment in the other direction, the contact being between fiber plugs F and round metal buttons S.

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Bethlehem performance warrants the guarantee under which they are sold—

"Guaranteed for the Life of the Car"

Made in special types for motors in which ordinary plugs cannot deliver.

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Packard New Model Trucks stand the LEDGER TEST

They have been subjected to every possible test of shop and of road.

Their advanced design is based on seven years' experience gained from the daily work of Packard trucks of the previous series.

The mechanical reasons for their efficiency and their economy of operation and maintenance are plain even to the unpracticed eye.

You can lay your finger right on the features that insure a balance on the right side of the ledger when all the operation costs and all the operation profits have been posted.

This new series of silent, up-to-date chainless trucks comprises 1, 1½, 2, 3, 4, 5 and 6-ton sizes, each possessed of the same advanced features. Early delivery on the 3 and 4-ton sizes.

To see them, or the catalog of them is well worth the while of every business man. Packardize your hauling and thereby make it stand the ledger test.

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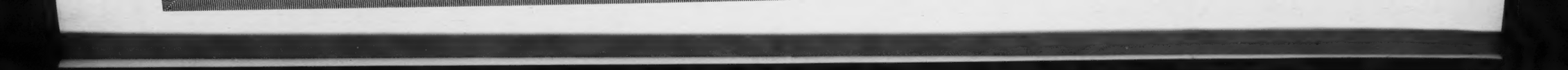


Russel

Your Careful Investigation

Will Prove the Truth

Of These Important Claims, and will Convince You it is to Your Advantage to Equip Your Trucks with the

Russel Internal Gear Drive Axle

SIMPLE—EFFICIENT—DURABLE—ECONOMICAL

The rear axle of a motor truck carries from 60% to 90% of the total weight of truck and freight load. Under even the most skillful guidance the truck is subject to tremendous strains, due to poor road and street conditions. Through heavy sand, ruts, over cobbly streets, raised or sunken tracks, is its daily path; and it must render continuity of service to be profitable. It is patent to the most unmechanical, therefore, that it is best the load-carrying unit (rear axle) be of solid construction, as in the case of a freight car, or heavy dray.

It is true the springs of a truck measurably relieve the rear axle from the bounding, swaying frame, body and freight load, but the supporting axle and wheels are in dead contact with road and subjected to a constant vibration and shock, these varying in intensity according to road or street and skill of driver.

The load-carrying axle of the Russel Internal Drive Gear construction is a solid alloy steel bar, tremendously strong, heat treated to make it tough and resisting to withstand the jar and strains due to speed and use of solid tires. Compare this to the live axle types necessitating heavy, expensive, bolted castings or housings liable to injury, breakage, or loosening at the joints, and your intelligence proves the desirability of the Russel Solid Axle Principle.

In rear axle types, other than the internal gear, the differential and propelling axle shafts are located in cast housings, and while often the load is carried wholly on the shell housings to relieve the propelling shafts, you readily recognize the advantage of the internal gear principle which places the differential and propelling shafts as independent units ahead of the load-carrying axle where they properly fulfill their function of transmitting power to the drive wheels by means of a simple, inexpensive spur gear on each propelling axle shaft engaging a toothed drum on the rear wheels.

12 Years Rigid Tests Have Proven the Remarkable General Utility of the *Internal Gear Drive Axle* for Motor Trucks

The Internal Gear Drive is 12 years young. In Continental Europe the most rigorous army and utility tests over every known passable road, field, mountain or street condition have proven beyond all doubt the superiority of the Internal Gear Drive, its economy and general efficiency over all other types. This test is of compelling significance because it is infinitely more severe than the roughest usage of a truck by our most careless drivers.

SAVES TIRES

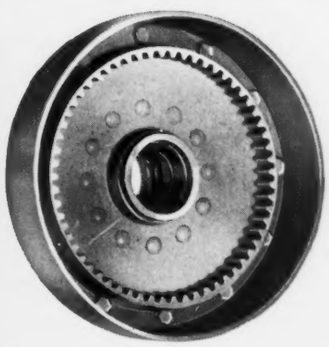
The weight of the Russel Internal Gear Drive Axle is materially less than any other type of shaft-driven axles, a most important point to truck users, because tires represent greatest upkeep-expense item.

The Russel Internal Gear Drive Axle is very quiet and smooth running.

SAVES LABOR

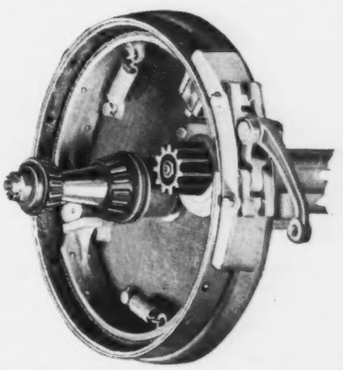
The parts of a Russel Internal Gear Drive Axle are very accessible. This means minimum time in service station when truck is under inspection. The Russel Internal Gear Drive Axle is not sensitive to minute mis-adjustment of parts, obviating high-priced labor.

The Russel Internal Gears are alloy steel, specially hardened, and will outwear other working parts of truck.



Gives Greatest Ground Clearance

Rocky or sandy roads make maximum ground clearance essential. The Russel Axle gives it. The Russel Internal Gear Drive Axle renders the most efficient and most economical service of any motor truck axle on the market. It may be run miles and miles without oil—an important item and a factor of insurance against costly expense where the driver is neglectful.



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North Detroit, Mich.

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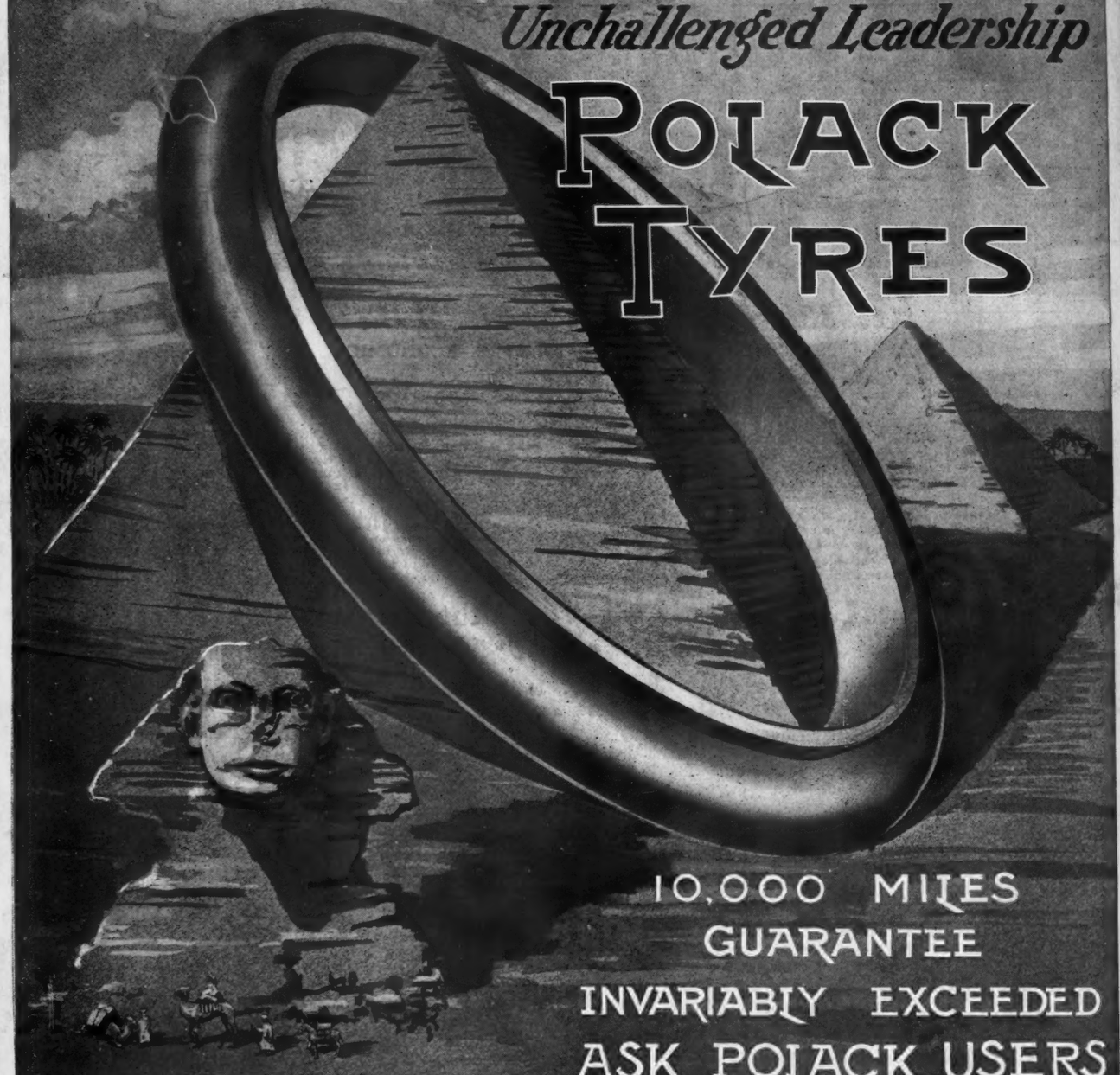

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